

FLIGHT

&
The AIRCRAFT
ENGINEER.

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER.

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Index and Title Page for Vol. IX.

The 8-page Index for Vol. IX of "FLIGHT" (January to December, 1917) is now ready, and can be obtained from the Publishers, 36, Great Queen Street, Kingsway, W.C. 2. Price 8d. per copy, post free.

EDITORIAL COMMENT.

"Newspapers are an essential part of our war organisation."—
(Sir Auckland Geddes, Minister of National Service.)



HO. would be a pioneer these days?

In 90 cases out of a 100 it's a thankless task, if not a crime, and the chances are still less that, having been a successful pioneer, the reward for the result falls to the right person.

These moral reflections obtained special point the other day when looking through some back volumes of "FLIGHT." We happened upon quite an interesting little *résumé* of the first beginnings of the Royal Flying Corps Hospital, and in glancing through the story we wondered how it came about that we had missed in the lists of honours which have recently been so very freely

let loose, names of some who history recordeth were not only the originators of the idea of this more than admirable undertaking, but were moreover the actual founders and supporters with their own personal funds and their own personal work through the early days of its struggle to have even a right to exist. The names which thus stood out in strongest light were those of a man and a woman. The man, Dr. Atkin Swan, whose was the inception of the R.F.C. Hospital, and Mrs. Hugh Paynter (wife of Lieut.-Commander H. H. Paynter, R.N.), to whom must be accorded the honour of actually establishing the Hospital, as a going concern at Netley House, Henrietta Street, W., in July, 1915, and maintaining it both by personal work, of the most arduous character and by contributions from her own pocket, until such time as the establishment began to get out of hand from sheer success in operation. These facts are undeniable, and moreover are set forth in detail in "FLIGHT" of February 17th, 1916. Since then the Hospital has made great strides, Mrs. Hugh Paynter later having to retire from further active participation in the work by reason of a complete breakdown in health, the result of her continuous work at the Hospital. Dr. Atkin Swan, who throughout has done such really valuable and gratuitous work for the Hospital, is, fortunately for those concerned, we believe, still devoting much of his time to the patients. Now although there have been recompenses to others who, however well their honours may be deserved, were unknown and unheard of in connection with the Hospital when the heat and burden of its early troubles had to be borne, yet these two real pioneers and the founders of what promises to be one of the greatest blessings to the Air Force ever conceived, have apparently been completely ignored. If by some oversight the names have escaped us in the honours lists, then we most humbly apologise. On the other hand, if, as we believe, we are right, then, subject to there being no technical obstacle, which it is claimed has so far prevented mere justice being done to Dr. Swan and Mrs. Hugh Paynter, we think that both these real war workers should receive honourable recognition in any supplementary list of honours which may be submitted to King George for consideration. If one half of the recipients of recent honours had as well earned them as these two "pioneers," there would not be so much cry for giving official reasons for favours conferred.

The New Menace.

As reported elsewhere in this issue, the inhabitants of Paris were disturbed during Saturday and Sunday last by explosions which were naturally at first ascribed to a daylight bombardment from the air, but which were later in the day ascertained to be those of projectiles fired from a long distance, probably from a new long-range gun. The belief that a daylight raid was in progress was strengthened by an official *communiqué* announcing that a few German aeroplanes had succeeded in crossing the lines and attacking Paris. In the light of subsequent happenings it would appear that these German aeroplanes, although they may possibly have dropped a few bombs, were over Paris to do "spotting" for the long-range guns rather than to drop bombs on definite objectives. If they could accomplish both tasks concurrently, so much the better, from the German point of view. From what can be gathered Paris did not let the bombardment produce anything resembling panic, but naturally enough some surprise was caused, and speculation is rife, not only in France but also on this side of the Channel, as to the exact nature of this new form of Hun frightfulness.

Many "explanations," some highly ingenious and others somewhat fantastic, have been offered, but the consensus of opinion appears to be that the enemy has succeeded in designing a new gun of far greater range than any hitherto in existence. The progress made during the war with improvements in long-range artillery has been enormous, and we can imagine—although we do not lay claim to any specific knowledge of the science of ballistics—that mechanically it should not be impossible to design a gun that would have a range of some 68 miles (which is about the shortest distance from the nearest point of the German lines to Paris). It is conceivable that by improvements in the propelling agent, by lengthening the gun barrel, and by carefully proportioning the shape of the projectile such a range may be made possible. So far as we know the application of what has been learned concerning "stream lining" in the study of aeronautics to projectiles has not been as extensive as one could have wished for, and although the velocities attained by the latter are far greater than those of aeroplane parts, the fundamental principle of both must be sensibly the same, and it is possible that at any rate part of the vast improvement in range which this latest German gun indicates, may be due to some such alteration in the shape of the projectiles used.

However, be that as it may, what concerns us most at the moment is the relation of what we at present will accept as a new German long-range gun to aircraft.

The fact that enemy aeroplanes were over Paris at the time of the bombardment would appear to indicate that, as we have already said, they were spotting for the new gun. It seems equally reasonable to suppose that if these machines were brought down the effectiveness of the gun would be seriously impaired. With a trajectory of such a length the range would probably have to be constantly corrected by aircraft and once the "eyes" were put out of action it would not, one would imagine, be long before the aim of the gun would become highly erratic.

From the point of effectiveness there does not

appear to be any grounds for undue anxiety, as according to reports the projectiles thrown are not of very large explosive power. Further, a gun capable of throwing a projectile such a distance would not, comparatively speaking, have a very long life, and to us it appears that a much more effective way of long distance bombardment is provided by aircraft. The daily papers have made the most of the excitement and curiosity aroused by the new German "menace" and maps have been published showing the area of southern England that would come within the range of such a gun, should the enemy get to Paris or Boulogne. In the first place there is no reason to suppose that he will get to either of these places, and secondly bombardment from the air is a much more certain method when the range is long. It is inevitable that the alleged production by the enemy of such a gun, which can after all only be considered a freak, will call forth in the Press indignant inquirers wishing to know why we have not got guns of similar range. To those we would point out that the best reply is aircraft, not only aircraft for blinding the "eyes" of the gun, but also aircraft with which to bomb the lines of communication, the factories, and the towns of the enemy. Even the "Big Gun" itself should form a reasonably good target on which to drop some Easter Eggs.

The Cabinet and the Royal Air Force.

Among the many interesting chapters into which the report of the work of the War Cabinet for the year 1917 is divided, that devoted to the air services is most absorbing. It is printed practically in full elsewhere in this issue and we think there will not be many who will begrudge the time spent in its perusal.

One thing stands out clearly—that it is largely due to the excellent work of Lord Cowdray, as President of the Air Board, that we owe the present Air Council and the Royal Air Force. Having tackled the problem of supplies for both the R.N.A.S. and the R.F.C. so successfully that there was likelihood of there being many more machines than could be utilized by the existing services, Lord Cowdray, realising the offensive and defensive value of this surplus of aircraft, felt the need of an Air War Staff to whom he could turn for advice as to their most effective utilization. True he had the naval and military members on the Air Board, but they sat there mainly as representatives of the Admiralty and Army Council. As a result Lord Cowdray drew up a scheme which he sent to General Smuts on July 28th last, and four weeks later the War Cabinet accepted the scheme in principle and nominated a Committee of Admiralty, War Office, Treasury and Air Board representatives to set about the organisation of the Ministry and the drawing up of the necessary legislation which received the Royal Assent on November 29th, four months after Lord Cowdray had put the scheme forward. In view of the fact that Lord Cowdray had demonstrated his breadth of vision and imagination with regard to aerial matters and had done such admirable work at the Air Board, it seems more than ever regrettable that the Prime Minister did not see his way to offer to him the opportunity of becoming the first Secretary of State for Air, instead of casting around for another, however admirable, may be and is the present Air

Minister. We are glad, however, that even at this late hour mere justice is being done in giving to Lord Cowdray the credit for the inception of the scheme which promises to do so much for aviation and for the country generally.

The Supply of Aircraft.

The concluding portion of the chapter deals with the supply of aircraft, and while some of the reasons advanced for delay bear the stamp of special pleading, reading between the lines one feels that much of the trouble in this respect has been due to what may be called lack of co-operation and which was, perhaps, unavoidable when four Ministries were concerned with the matter. Now, however, that the question of the supply of aircraft has been definitely placed in the hands of the Aeronautical Supply Department of the Ministry of Munitions, it is to be hoped that there will be improvement in this respect. Still it is gratifying to read that "during the year

1917 not only was the number of squadrons of aircraft on the various fronts increased in a notable degree, but there was a complete replacement of machines and engines of the older types. The very great increase in output being obtained has placed a considerable strain on the workers in the aircraft and aero-engine factories of the country, a strain which is being met on the whole in a satisfactory manner. The difficulties in connection with production are aggravated by the competing claims of many different types of aero-engines. Standardisation is the ideal, but it is obviously difficult of attainment, having in view the importance of not losing time in production and at the same time of keeping abreast with the very latest development necessitated by the need for constant increase of horse-power and higher performance. The Air Council are most keenly impressed by the need for concentration on a few approved engines, and they have the whole question of the reduction of numbers of types under constant and careful consideration.

GALLANT AIR WORK.

WITH reference to the awards conferred as announced last October, the following are the statements of services for which the decorations were conferred:—

Distinguished Service Order.

Second Lieutenant A. P. F. RHYS-DAVIDS, M.C., R.F.C., Spec. Res.—For conspicuous gallantry and devotion to duty in bringing down nine enemy aircraft in nine weeks. He is a magnificent fighter, never failing to locate enemy aircraft and invariably attacking regardless of the numbers against him.

Second Bar to the M.C.

Lieutenant L. M. BARLOW, M.C., R.F.C., Spec. Res.—For conspicuous gallantry and devotion to duty in aerial combats. In the course of a fortnight he destroyed several enemy machines; on one occasion he attacked four enemy scouts and shot one down in flames, and two others, which were seen to crash. He showed the greatest gallantry, dash, and skill.

Bar to the M.C.

Second Lieutenant R. B. ASHCROFT, M.C., Notts. and Derby Regiment, Spec. Res. and R.F.C.—For conspicuous gallantry and devotion to duty in attacking enemy troops from an extremely low altitude; on one occasion he attacked from the rear from a height of about 150 ft., the enemy that were holding up our infantry.

Lieutenant (Temp. Capt.) G. H. BOWMAN, M.C., R. War. Regiment, Spec. Res. and R.F.C.—For conspicuous gallantry and devotion to duty in leading 25 offensive patrols in two months, shooting down five enemy aircraft, and showing marked skill as a leader.

Second Lieutenant (Temp. Lieut.) R. T. C. HOIDGE, M.C., R.G.A., Spec. Res. and R.F.C.—For conspicuous gallantry and devotion to duty in shooting down 14 enemy aircraft in three and a half months. After attacking a large formation of enemy aircraft, owing to engine trouble he was driven down to 600 ft. at least five miles from our lines, but managed to recross the lines at a height of 500 ft., and so saved his machine.

Second Lieutenant (Temp. Capt.) J. T. B. MCCUDDEN, M.C., Gen. List and R.F.C.—He took part in many offensive patrols, over 30 of which he led. He destroyed five enemy machines and drove down three others out of control. He showed the greatest gallantry, dash and skill.

Lieutenant A. E. MCKEEVER, M.C., R.F.C., Spec. Res.—For conspicuous gallantry and devotion to duty in aerial combats. He has recently destroyed five enemy aeroplanes and driven down six out of control. On one occasion he encountered five enemy scouts, and drove down two out of control. Later, while leading a patrol, he engaged nine enemy scouts. He destroyed two, drove down one out of control, and dispersed the remainder. His dash and determination have been a fine example to his squadron.

Second Lieutenant K. R. PARK, M.C., R.F.A. and R.F.C.—For conspicuous gallantry and devotion to duty in accounting

for nine enemy aircraft, three of which were completely destroyed and six driven down out of control.

Second Lieutenant A. C. YOUNG, M.C., R.F.C., Spec. Res.—For conspicuous gallantry and devotion to duty in attacking enemy troops from an extremely low altitude. On one occasion he attacked from the rear, from a height of about 150 ft., the enemy that were holding up our infantry.

The Military Cross.

Temp. Second Lieutenant R. H. AYRE, Gen. List and R.F.C.—During a period of five months he took part in many successful bombing raids. On one occasion he bombed an enemy airship shed, and on another occasion bombed a railway station from a height of 500 ft. He derailed part of a train, and then engaged the occupants with machine-gun fire. He displayed the greatest gallantry and determination.

Second Lieutenant (Temp. Lieut.) J. H. BROADWAY, Dorset Regiment, Spec. Res., att'd. R.F.C.—For conspicuous gallantry and devotion to duty. He attacked a party of six enemy machines, driving one down over the enemy's lines. He has always set a splendid example of courage and devotion to duty.

Second Lieutenant (Temp. Capt.) C. A. BREWSTER-JOSKE, Gen. List and R.F.C.—For conspicuous gallantry and devotion to duty in taking part in 29 air fights, in which he has destroyed seven hostile machines.

Temp. Second Lieutenant G. W. FERGUSON, Gen. List and R.F.C.—As pilot in an artillery squadron, whilst on artillery observation, he was attacked by several hostile machines, two of which he drove off, the remainder breaking off the combat. Again, whilst on artillery patrol he attacked and drove down an enemy machine out of control. On a third occasion while engaged on artillery work, observing a party of enemy infantry, he dived on them, firing, and sent a wireless call to the artillery, which opened fire. This officer has shown exceptional capabilities as an artillery pilot, frequently carrying out his work at a low altitude, observation being otherwise impossible owing to low clouds.

Second Lieutenant (Temp. Capt.) A. GRAY, Argyll and Sutherland Highlanders and R.F.C.—He took part in many successful operations over the enemy's lines, in over 20 of which he acted as leader. On one occasion, when leading a bombing raid, his formation was heavily attacked by enemy aeroplanes. He shot one of them down, and brought back the whole of his formation safely. He also led a successful raid on an enemy aerodrome, and on several occasions obtained valuable photographs. He has accounted for two enemy aeroplanes, with his front gun, and always showed great coolness, ability, and resource.

Temp. Second Lieutenant R. F. HILL, Gen. List and R.F.C.—He has carried out a great deal of useful observation work, and has proved himself an excellent fighting observer. On one occasion, when acting as observer on a photographic reconnaissance, he and his pilot shot down and destroyed two enemy scouts. He has also destroyed three other hostile machines.

Second Lieutenant C. F. HORSLEY, Norfolk Regiment

and R.F.C.—While on a photographic reconnaissance he was attacked by eight enemy aeroplanes, and after a fight which lasted over 20 minutes drove down two of the enemy. On another occasion he took part in an encounter between six of our machines and 25 enemy aeroplanes, in which he displayed great coolness and skill in driving off the attacking enemy. He has led many successful reconnaissances, and on several occasions has been attacked by superior numbers of the enemy.

Temp. Capt. J. LEACROFT, Gen. List and R.F.C.—On one occasion he flew at a very low altitude in extremely bad weather and successfully engaged enemy troops with machine-gun fire, and on another occasion carried out a most valuable reconnaissance and engaged enemy troops from a height of 100 ft. He destroyed two hostile machines, and has proved himself a courageous and determined pilot.

Temp. Lieutenant H. G. E. LUCHFORD, Gen. List and R.F.C.—He has carried out a great deal of extremely useful work, and has proved himself a capable and determined leader. On one occasion when on a photographic reconnaissance he and his observer shot down and destroyed two enemy scouts. He has destroyed five other hostile machines.

Second Lieutenant (Temp. Lieut.) F. L. McCREARY, S. Lancs. Regiment and R.F.C.—When his machine was attacked by a hostile scout in a thick mist the pilot was killed instantly and the machine started going down with the enemy machine still following. Though wounded in the hand, he drove the enemy machine off with his machine gun and got the machine under control. He brought it to within 200 ft. of the ground, when it crashed within a mile of his aerodrome. Although wounded and much shaken he proceeded to his corps headquarters and made his report. He showed great coolness and skill.

Temp. Lieut. F. T. S. MENENDEZ, Gen. List and R.F.C.—For conspicuous gallantry and devotion to duty in carrying out photographic reconnaissances and bombing raids far behind the enemy lines. On one occasion, when attacked by five enemy scouts, he drove three of them down and the other two then withdrew. On two other occasions he has driven down enemy machines out of control.

Lieutenant (Temp. Capt.) M. D. G. SCOTT, N. Lancs. Regiment, Spec. Res., and R.F.C.—For conspicuous gallantry and devotion to duty in aerial combats. On one occasion

his patrol encountered seven enemy machines, two of which he drove down out of control. He has destroyed eleven enemy aeroplanes, and proved himself a very dashing patrol leader.

Second Lieutenant C. A. STEVENS, W. Riding Regiment and R.F.C.—He took part in over 30 successful operations over the enemy's lines, including long-distance photographic reconnaissances and bombing raids. On one occasion he was heavily attacked by enemy aeroplanes, one of which he destroyed, and returned with excellent photographs, and with his machines badly shot about. On another occasion when leading a bombing raid, the formation was heavily attacked by enemy aeroplanes. He skilfully kept the formation together and led it back to the aerodrome. He consistently set a fine example by his skill and determination.

Second Lieutenant R. WINNICOTT, Devon Regiment and R.F.C.—For conspicuous gallantry and devotion to duty in aerial combats. In a fight against the enemy scouts he drove down two out of control. On another occasion, he destroyed an enemy scout, and on three previous occasions drove down enemy machines out of control. His dash and determination were of the highest order.

Lieutenant A. G. GOULDING, Can. Infantry and R.F.C.—While escorting a bombing squadron, he attacked and drove down a hostile two-seater machine. He showed great determination and gallantry on many other occasions.

DETAILS are now available of the deeds which won awards dated November 19th last, and among the awards of the Military Cross were the following:—

2nd Lieut. (Temp. Capt.) G. L. Lloyd, Yeo. and R.F.C.—Single-handed, he attacked three enemy machines, one of which he brought down out of control. On another occasion he attacked four enemy machines, one of which he brought down in a steep dive. He has brought down many other enemy machines and taken part in numerous combats, displaying magnificent gallantry and skill on all occasions.

Lieut. W. B. Ferguson, Can. Rail. Troops and R.F.C.—He has continuously done valuable work in locating targets and ranging and observing artillery fire, and was responsible on several occasions for the destruction of hostile batteries by our artillery. He successfully took part in several aerial combats while engaged in this work, and showed great initiative and determination throughout.



Medals for the R.F.C.

It was announced in a supplement to the *London Gazette* on March 19th, that the King has been pleased to approve of the award of the Military Medal for bravery in the field to the following:—

- 14115 1st Air-Mech. W. C. Lindsay, R.F.C.
- 5715 1st Air-Mech. F. C. Mills, R.F.C.
- 115269 1st Air-Mech. J. Ryder, R.F.C.
- 9866 1st Air-Mech. H. D. Tipler, R.F.C.
- 43691 2nd Air-Mech. W. G. Worsdall, R.F.C.

The King has been pleased to approve of the Meritorious Service Medal to the undermentioned for gallantry in the performance of military duty:—

- 77725 2nd Air-Mech (A. Corpl.) E. Treadaway, R.F.C.
- 2190 1st Air-Mech. C. J. Woodford, R.F.C.

Life-Saving Rewards.

THE King has been pleased, on the recommendation of the President of the Board of Trade, to award the Silver Medal for Gallantry in Saving Life at Sea to Flight Sub-Lieutenant (now Flight Lieutenant) James Lindsay Gordon, R.N., Flight Sub-Lieutenant (now Flight Lieutenant) George Ritchie Hodgson, R.N., Leading Mechanic (E) Sydney Francis Anderson, and Wireless Telegraphist (A.M.II.) Bertram Harley Millichamp in recognition of their services in rescuing two men from an upturned float in the North Sea on May 29th last.

German Excuses for Paris Raids.

SOME interesting comments attributed to the General in command of the German Aerial Forces, on the reasons for the air raids on Paris, appeared in the *Cologne Gazette* on March 17th. He said:—

"It is true that the aerial attacks on Paris had no direct military aims in view, and that they also were not directed against the fortress, but against the City of Paris. The French have no reason to be indignant, as these attacks were a punishment for the enemy's attacks last Christmas Eve and in January, and also for those again undertaken, in spite of these warnings, in February, against open towns in Germany situated far outside the region of military operations."

"Hitherto our air attacks have been exclusively directed against such targets as were directly connected with military activities at the front. Although the majority of the enemy's attacks against open German towns were without effect, thanks to our defensive measures, some of them have inflicted heavy sacrifices upon us."

The Work of the U.S. Aviators.

ACCORDING to a message from New York, the President has appointed a Commission, under Mr. Snowden Marshall, to examine the whole subject of the activities of the U.S. aviators in France, &c., while Mr. Howard E. Coffin, of the Aircraft Production Board, is investigating the delays which have occurred in the production of aircraft.

Aircrew Analysis.

WITH reference to the article by Dr. Zahm, published in our issue of January 31st, we have received the following from Mr. E. Fowler Clark, B.Sc., B.A.:—

"Referring to the article by A. F. Zahm, entitled 'Aircrew Analysis,' in your issue of January 31st, may I be permitted to point out an error occurring in the last section, viz., gyroscopic loads, the nature of which, no doubt you will agree, is such that it seems advisable to offer this correction.

"The linear force parallel to X on the particle m at x, y, z is stated to be $f = m z \omega \Omega$, whereas this should be $f = 2 m z \omega \Omega$, with the result that all the gyroscopic torques derived in succeeding paragraphs, except (18) for an entire screw, should be doubled.

"In explanation of this I would say that the velocity of the particle m at x, y, z is made up of two components:—

"(1) One $y \Omega$, as stated, which is undergoing change of magnitude.

"(2) Another, $\gamma \omega$, at right angles to the first, which is undergoing change of direction.

"It can be mathematically shown that the respective rates of change of velocity, each contribute a term $z \omega \Omega$ to the total acceleration, which acceleration is, therefore, $2 z \omega \Omega$.

AN ALBATROS FIGHTING BIPLANE.

(Continued from page 310.)

THE Albatros biplane belongs to the C class, that is to say is a general utility machine variously used for fighting, reconnaissance, artillery spotting and photography, and is therefore not to be considered a bombing machine. It is, however, provided with racks for a small number of bombs—four, to be exact—presumably by way of cases of emergency when a suitable target might present itself. Fig. 20 is a diagrammatic perspective view of the bomb racks and bomb release gear. The bombs are secured underneath the main tank in the pilot's cockpit, but they are released by the gunner in the rear cockpit by means of a small lever and quadrant shown in the upper right-hand corner of Fig. 20.

The bomb racks are in the form of sheet steel supports, against the bottom of which rest the nose and the tail of the bombs respectively. These

As regards the cams which operate the bombs, these are mounted on a transverse shaft running across the bottom of the fuselage. There are four cams, each operating its trigger, but the gearing of the camshaft is such that it requires five pulls on the lever in the gunner's cockpit to rotate the shaft through a complete revolution. One of these pulls of the lever has no corresponding cam on the shaft, and has, it appears, been incorporated in order to provide an equivalent of a safety catch. When all the bombs are in place the first pull on the lever does not release a bomb, but merely brings the cam for bomb No. 1 into position, ready to press, on the next pull of the lever, the trigger for the first bomb. This has evidently been done as a precaution against accidentally releasing a bomb until the machine is approaching an objective.

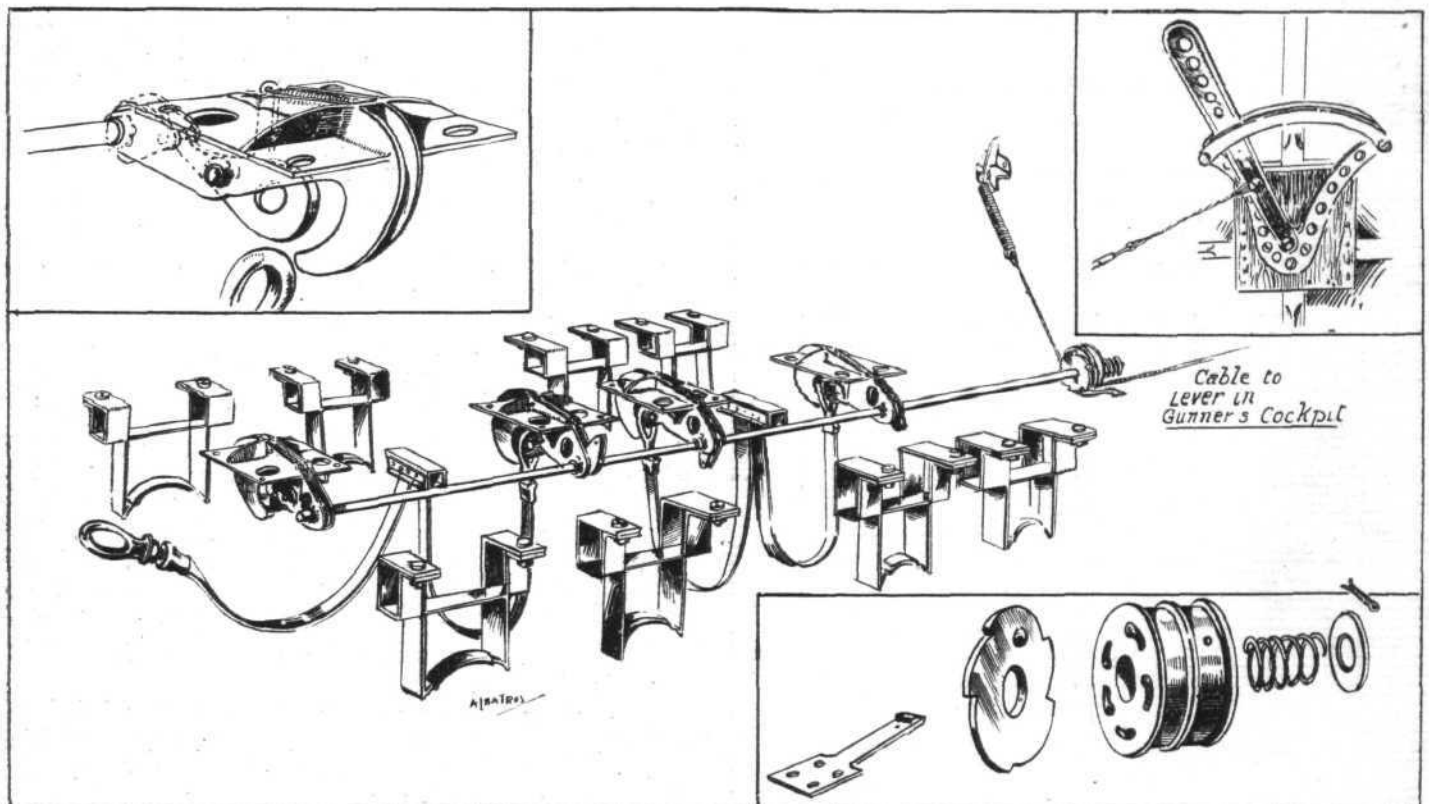


Fig. 20.—Details of the bomb gear on the Albatros biplane.

brackets are secured to transverse members in the bottom of the fuselage, which have been omitted in the drawing for the sake of clearness. The bombs themselves are supported by a steel strap or band, passing underneath and approximately under the middle of the bombs. At one end the straps are hinged, while at the other they are provided with an eye, which is secured in the hook under the release trigger. The sketch in the upper left-hand corner of Fig. 20 shows in more detail the hook in which the eye of the strap rests, and the trigger by means of which the strap is released. The trigger is pivoted near its centre, and has an upward projection to which is attached a small coil spring resting in a groove in the base supporting the hook. When the cam on the transverse shaft presses down the rear end of the trigger, the front end moves upward against the tension of the coil spring mentioned above, thus releasing the strap and with it the bomb.

We now come to consider the method of operating the transverse camshaft. Near the right-hand side of the fuselage there is mounted on the camshaft a small ratchet having five teeth as shown in the bottom right-hand corner of Fig. 20. On this ratchet is a small cam, roughly of cone shape. This cam engages with grooves in the pulley around which passes the operating cable. A small leaf spring engages at the proper moment with the notches in the ratchet and prevents the shaft from rotating in the reverse direction. One end of the operating cable is attached to a coil spring secured to the side of the fuselage, and passes from there around the pulley to the lever in the gunner's cockpit. Assuming that the first cam is in position ready to release its bomb, a backward pull of the lever rotates the pulley and with it the ratchet and camshaft, thus pressing down the trigger of one of the bomb racks and releasing a bomb. When the gunner releases the lever this is pulled

forward to its normal position by the spring on the side of the fuselage. The little leaf spring engaging with the ratchet prevents this and the shaft from following the pulley round in the opposite direction,

and the cam on the ratchet sliding up the sloping bottom of one of the five grooves in the face of the pulley forces the pulley away from the ratchet against the compression of a small coil spring shown in the sketch. By the time the lever has reached its forward position, the pulley has revolved to such an extent as to bring the cam on the ratchet into the next groove in the pulley, and when the lever is again pulled the whole action is repeated. The sketch will probably help to make the action clear.

In addition to a bomb release lever, there is in the gunner's cockpit another lever, the function of which appears to have been to engage and disengage a clutch near the engine, by means of which a drum is operated carrying the aerial of the wireless. In the bottom of the gunner's cockpit, near the left-hand side, is an octagonal opening in the floor, in which, so far as we can make out, the camera was mounted. The compass, so as to be visible from both cockpits, has apparently been mounted in a circular opening in the right-hand lower main plane.

We now come to deal with the wings of the Albatros. These are, generally speaking, of the construction favoured by the Albatros designer, that is to say, the front spar is well forward close to the leading edge, and the rear spar is approximately half-way along the chord. In addition there is a third false spar, which is not, however, connected up to the body nor supported by any struts, and which cannot therefore be considered as taking any particularly important part of the load. It will, therefore, be realised that the rear main spar may at small angles of incidence, when the centre of pressure moves backwards, be called upon to support all or nearly all of the load. This has evidently been guarded against in the Albatros by making the rear spar of generous proportions. Both main spars are made of spruce, and are of the box type, consisting of two halves spindled out and glued together with a hardwood tongue running through both flanges. The ribs are of I-section, with spruce webs and ash flanges. Between the main spars false ribs are employed half-way between the adjoining main ribs, so as to better preserve the curvature of the wing for this distance.

The general arrangement of the upper left-hand wing is shown with dimensions in Fig. 21, from which the general lay-out of the wing will be clear. The internal drift wiring is in the form of five bays, the compression struts for this wiring being in the form of circular section steel tubes. In the two inner bays both drift and anti-drift wires are in duplicate and are approximately 12 S.W.G. The next two bays have single wiring, also of 12 S.W.G., while the outer bay has single wiring of 14 S.W.G.

The attachment for the compression tubes and the drift and anti-drift wires is shown in Fig. 22. A box of thin sheet steel surrounds the spar at this point and is bent over and bolted as shown in the small section in Fig. 22. On the inner face of the spar this sheet steel box has two wiring plates stamped out, which receive the drift and anti-drift wires. A short cylindrical distance piece is welded on to the box, and around this fits a short tubular sleeve held in position by a split pin. This sleeve forms a socket for the tubular compression strut.

Vertically the spar is pierced at this point by three holes, for the bolts securing the interplane strut and the two interplane cables. The attachment for the latter is shown at the bottom of Fig. 22. The base

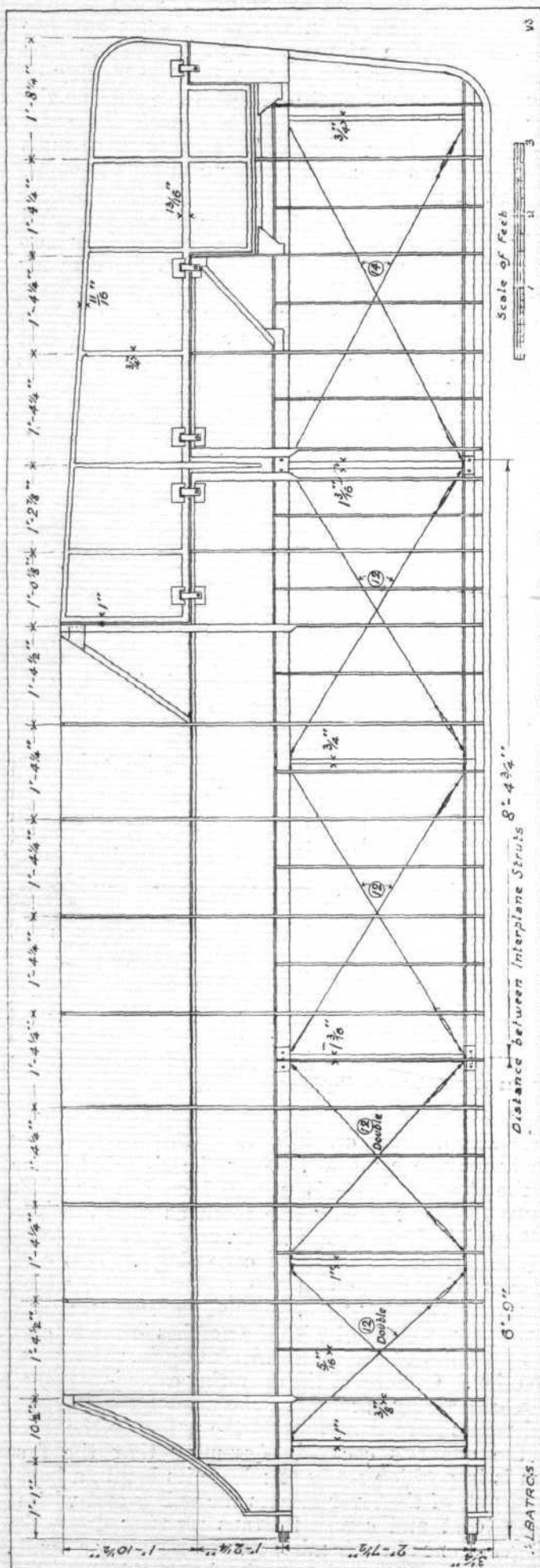


Fig. 21.—General arrangement of the upper left-hand wing of the Albatros biplane, to scale.

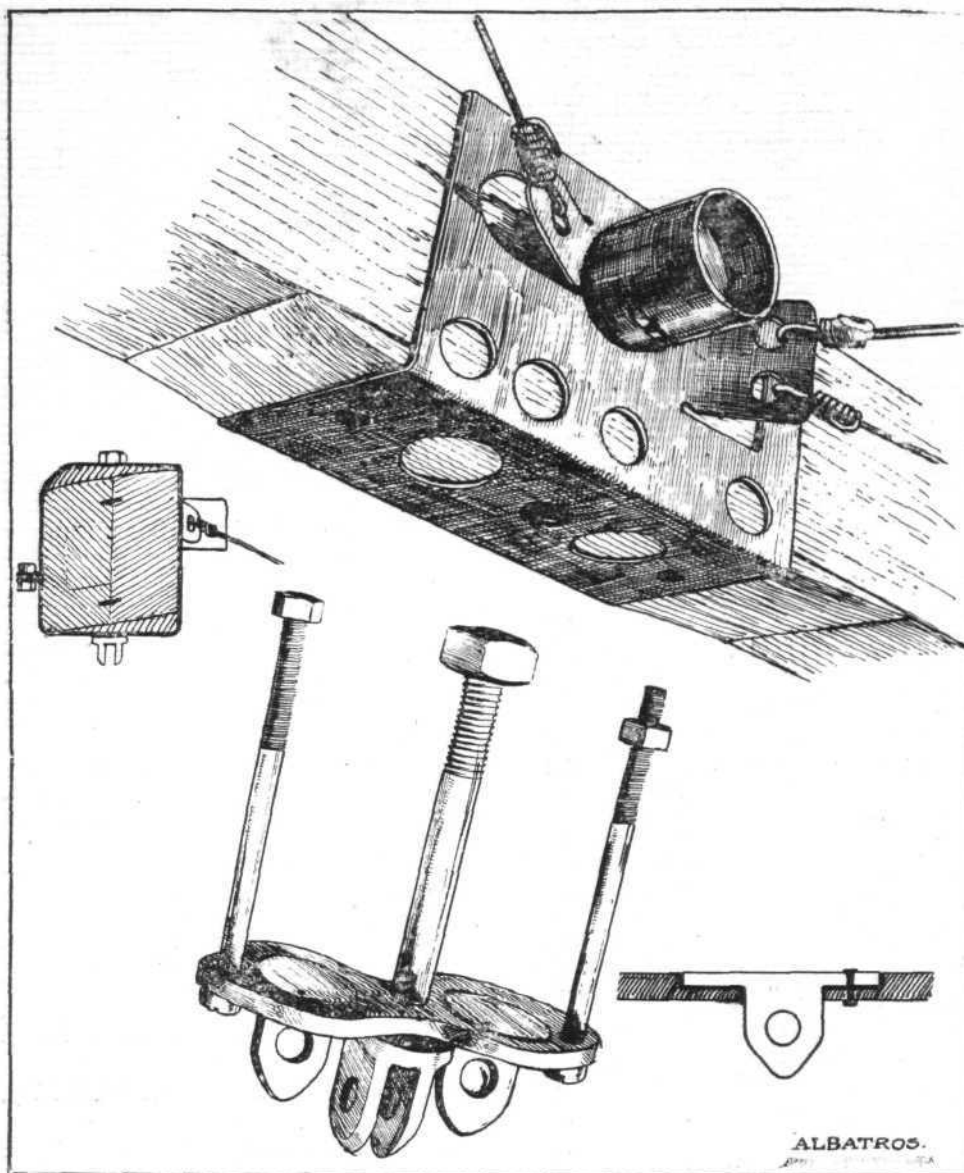


Fig. 22.—Sheet steel spar box and socket for compression tube of the upper plane of the Albatros biplane. The bottom sketch shows the attachment of the terminals for the interplane cables and struts.

These terminals are prevented from rotating by a small rivet as shown in the sectional view. In order to further strengthen the spar at the point where it is pierced by these three bolts, the spar is left solid for a short distance on each side of the box, and packing pieces are interposed between the box and the spar, so as to bring it up to an approximately rectangular section in order to get the bolts coming through the spar and base plate at right angles.

In Fig. 23 are shown sections, to scale, of the two main spars, the false spar, and the leading edge. The trailing edge is, as in the majority of German machines, in the form of a wire.

Fig. 24 shows the shape and dimensions of the wing section. As in nearly all German machines, the camber is, it will be seen, extremely great both as regards the upper and lower surface.

The precise object of employing such a wing section is not at once apparent, but it should be remembered that generally speaking the German machines carry a comparatively great load per square foot of wing surface, and the probabilities are that the section has been designed with a view to enable the wing to support this high load at comparatively

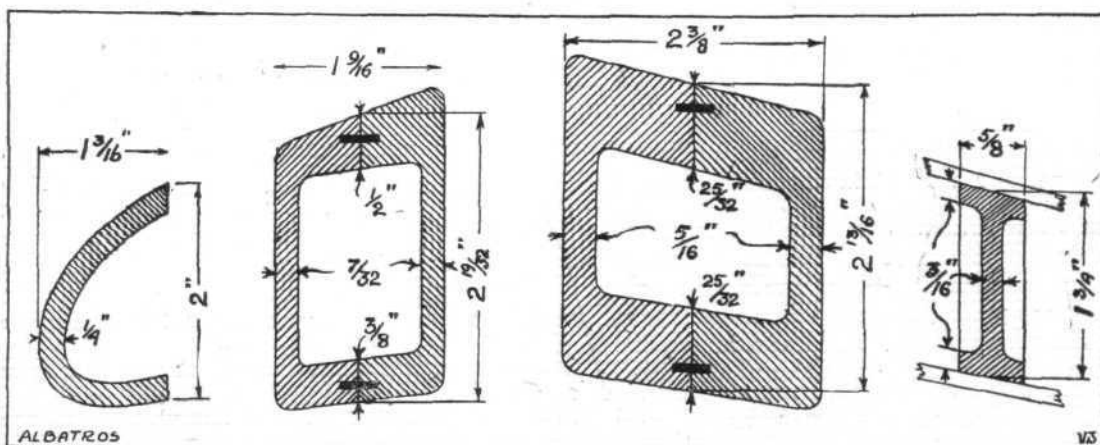


Fig. 23.—Sections, to scale, of the leading edge, main spars, and false spar of the Albatros biplane.

plate has machined in it two recessed circular openings which receive the two terminals for the cables.

great altitudes, and has therefore probably an excess resistance at lower levels.

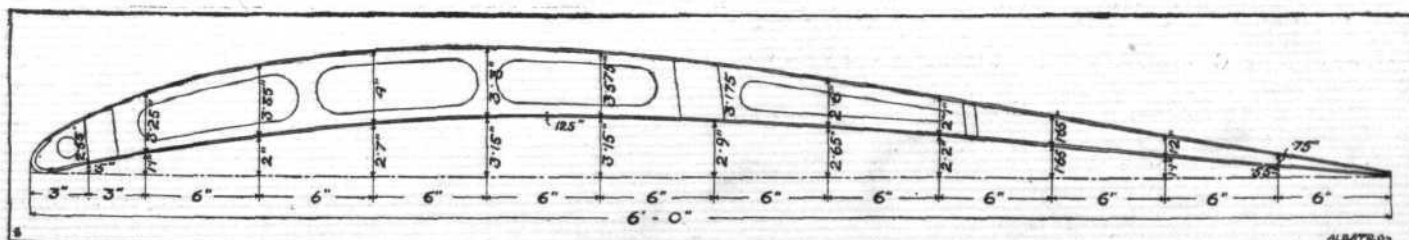


Fig. 24.—The wing section of the Albatros biplane.

This is not quite clear, however, and it would be extremely interesting to have the results of wind tunnel tests on some of these German sections, and we sincerely hope that the National Physical Laboratory may be able to find the time to carry out such experiments.

Superficially the section does not impress one as being particularly efficient, but wind tunnel tests might reveal the fact that it is a good section for carrying high loading at considerable altitudes.

(To be continued.)

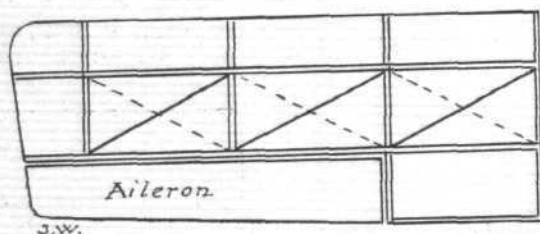
ANSWERS TO CORRESPONDENTS

[As a number of letters reach us signed with initials only, some of which do not give a complete address, we would point out that such communications cannot be dealt with in our columns. Full name and address, which will not be published, must always be given.—Ed.]

N. F. (Sheffield).—The Roe triplane with 9 h.p. Jap. engine was described in *Aeronautics* for January, 1909. We have not been able to find any data relating to the Clerget Tandem Biplane to which you refer.

E. G. W. (Wanstead).—The chief object of staggering the planes of a biplane is that in this way a somewhat better view is usually obtained for the pilot. Constructionally staggering is not an advantage. On the contrary stagger introduces additional stresses in the wing bracing. There is a slight gain in aerodynamic efficiency when the wings are staggered to a certain extent. The book entitled "Aeroplane Design" by F. S. Barnwell treats solely aerodynamic problems, and does not touch upon structural design from the point of view of stresses. For this we should recommend you to obtain a copy of A. W. Judge's book, "The Design of Aeroplanes," in which the question of graphical statics is dealt with. A copy can be obtained from the offices of "FLIGHT," the price being 14s.

W. J. C. (Newcastle-on-Tyne).—With reference to our reply to J. H. (Bradford) in our issue of February 14th concerning duplicate drift wires, we have reproduced again



the diagram in question. Theoretically, the pull in the single wire should be twice that in each of the drift wires, or, putting it another way, if the initial tension in the anti-drift wire

is 100 lbs., the tension in each of the drift wires should be 50 lbs. The total tension on the terminal fitting would then be $50 + 50 = 100$ lbs. This is a theoretical case, and presupposes that no stretch takes place. That the tension in each of the drift wires should be 50 lbs. and not 100 lbs., may, perhaps, be made clear by saying that the same result would be obtained by substituting one solid wire of twice the strength, or in other words of twice the cross sectional area of the anti-drift wire (providing, of course, that the tensile strength of the material is the same in both cases). The tension in the anti-drift and in the drift wire would then be the same (say 100 lbs.), but the intensity of stress would be only half in the case of the drift wire, since intensity of stress = pull or tension : cross sectional area. If the tension in the two diagonal systems of wires were not the same, the frame would distort until the tensions were the same, assuming, of course, that the frame is pin jointed and free to be deformed by the tension in the wires. In practice this is not usually the case, as the fittings holding the wires and compression struts generally prevent, to some extent, the free deformation of the frame. If stretching of any of the wires takes place, the question becomes more involved, but we take it that what you are referring to is the theoretical case.

E. M. (Chelmsford).—Apply to the Secretary, Air Ministry, Strand, W.C.2, setting out in full your qualifications.

M. L. F. (Clydach).—We believe the official description is French blue. It may be described as a dark slate blue.

Z. A. (Birmingham).—We regret we cannot give you the information asked for.

L. W. W. (Eastbourne).—The old ranks disappear and you will be entered as a "Probationer."

J. S. (Oldham).—You could get a copy of the Memorandum from the office of the Air Ministry, Strand, W.C.2.

R. T. (Derby).—Probably you could obtain a copy of Mr. A. P. Young's paper on "Magneto Ignition" from the Secretary of the Aeronautical Society, 7, Albemarle Street, W.

E. D. (Finchley).—Messrs. A. E. Jones, Ltd., 97, New Bond Street, W.C.1, or Messrs. T. W. K. Clarke and Co., Hampton Wick, could doubtless assist you.

Appointments in the Royal Air Force.

THE following announcement appeared in the *London Gazette* on March 22nd, dated Air Ministry, March 22nd:—

The following officers are attached to the Royal Air Force, and are granted temporary commissions in that Force in the ranks stated below:—

Air Council.

January 3rd.

Sir David Henderson, K.C.B., D.S.O. (Lieut.-Gen. in Army), to be Lieut.-Gen.

Sir H. M. Trenchard, K.C.B., D.S.O. (Major-Gen. in Army), to be Major-Gen.

M. E. F. Kerr, C.B., M.V.O. (Rear-Admiral Royal Navy), to be Major-Gen.

Sir G. M. Paine, K.C.B., M.V.O. (Commodore, Royal Navy), to be Major-Gen.

W. S. Brancker (Bt. Col. in Army), to be Major-Gen.

Air Ministry.

February 18th.

A. V. Vyvyan, D.S.O. (Capt. R.N.), to be Col. and to be Temp. Brig.-Gen. while a Director.

H. D. Briggs (Capt. R.N.), to be Lieut.-Col., and to be Temp. Brig.-Gen. while a Director.

W. W. Warner (Bt. Lieut.-Col., Indian Army), ret., to be Lieut.-Col., and to be Temp. Brig.-Gen. while a Director.

B. C. H. Drew (Bt. Lieut.-Col. Indian Army), to be Lieut.-Col., and to be Temp. Brig.-Gen. while a Director.

R. C. Munday (Fleet Surgeon, R.N.), to be Major-Gen. (March 5th, 1918).

The following officers are transferred to the Royal Air Force and granted temporary commissions in that Force in the ranks stated below:—

February 18th.

F. C. Jenkins (Bt. Major in Army, Spec. Res.), to be Lieut.-Col. and to be Temp. Brig.-Gen. while a Director.

A. Huggins, D.S.O. (Capt. in Army, Spec. Res.), to be Lieut.-Col., and to be Temp. Brig.-Gen. while employed as a Director.

C. H. Whittington, C.M.G. (Capt. in Army, Spec. Res.), to be Lieut.-Col., and to be Temp. Brig.-Gen. while a Director.

A. Fletcher, M.C. (Quartermaster and Hon. Capt. in Army) to be Lieut.-Col., and to be Temp. Brig.-Gen. while a Director

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

THE FLYING SERVICES FUND administered by THE ROYAL AERO CLUB.

THE Flying Services Fund has been instituted by the Royal Aero Club for the benefit of officers and men of the Royal Naval Air Service and the Royal Flying Corps, who are incapacitated on active service, and for the widows and dependants of those who are killed.

The fund is intended for the benefit of all ranks, but especially for petty officers, non-commissioned officers and men.

Forms of application for assistance can be obtained from the Royal Aero Club, 3, Clifford Street, New Bond Street, London, W.1.

Subscriptions.

	£	s.	d.
Total subscriptions received to March 12th, 1918	12,636	15	11
Staff and Workers of Gwynnes, Ltd. (Fifty-ninth contribution)	10 6 2

Total, March 26th, 1918 12,647 2 1

H. E. PERRIN, Secretary.

3, Clifford Street, New Bond Street, W. 1.

THE ROLL OF HONOUR.

REPORTED by the Admiralty:—

Previously Missing, now reported Killed.

Flight Sub-Lieut. Edward G. A. Eyre, R.N.
Acting Flight Commander R. R. Winter, R.N.

Accidentally Killed.

Flight-Lieut. H. J. Arnold, D.S.O., R.N.
Prob. Flight Officer L. Brown, R.N.
Flight Sub-Lieut. Cyril W. Emmett, R.N.
Prob. Flight Officer C. C. Franklin, R.N.
Flight Sub-Lieut. Godfrey J. W. Goodwin, R.N.
Prob. Flight Officer E. W. Harland, R.N.
Aircraftman, 2nd Cl., F43316, A. S. Cole, R.N.A.S.

Drowned.

Flight Sub-Lieut. C. T. Greenwood, R.N.
Flight Sub-Lieut. C. G. Macdonald, R.N.

Died.

Mr. A. C. Hassett, W.O. R.N.A.S.
Prob. Flight Officer Warwick H. Turner, R.N.

Wounded.

Flight Sub-Lieut. C. E. Wodehouse, R.N.

Slightly Wounded.

Flight Sub-Lieut. G. M. Cartmel, R.N.

Accidentally Injured.

Prob. Flight Officer W. J. Allen, R.N.
Flight Sub-Lieut. William S. Anderson, R.N.
Prob. Flight Officer Francis R. Carlin, R.N.
Prob. Flight Officer William J. Kelly, R.N.
Prob. Flight Officer F. N. Lawler, R.N.
Prob. Flight Officer A. H. Matthews, R.N.
Prob. Flight Officer C. E. Sherlock, R.N.
Prob. Flight Officer C. B. Smith, R.N.
Prob. Flight Officer Cyril F. Walker, R.N.

Missing.

Flight Sub-Lieut. J. L. Allison, R.N.
Acting Flight Commander R. P. Minifie, D.S.C., R.N.
Flight Commander L. W. Ormerod, D.S.C., R.N.
Observer Sub-Lieut. W. L. H. Pattison, D.S.C., R.N.
Flight Sub-Lieut. L. B. Ransford, R.N.
Flight Sub-Lieut. G. T. Steeves, R.N.
Acting Air-Mech. 1st Grade, F7029 P. J. Capp, R.N.A.S.

Reported by the War Office:—

Killed.

Lieut. F. J. Batt, R.F.C.
2nd Lieut. R. S. Collins, R.F.C.
2nd Lieut. G. W. A. Green, R.F.A., attd. R.F.C.
Lieut. J. B. L. Heney, M.C., Can. F.A., attd. R.F.C.
2nd Lieut. A. E. Ikin, R.F.C.
2nd Lieut. A. S. Kynoch, R.F.C.
2nd Lieut. F. J. McNiff, North'd Fus., attd. R.F.C.
2nd Lieut. R. Moore, R.F.C.
2nd Lieut. D. A. S. Stevens, R.F.C.
Lieut. D. E. Stevens, Manch. R., attd. R.F.C.
2nd Lieut. D. Woodman, R.F.C.
2nd Lieut. R. H. Yell, R.F.C.
4411 Sergt. E. T. Hardeman, R.F.C.
27066 1st Air-Mech. J. Nelson, R.F.C.

Previously Missing, now reported Killed.

Capt. E. D. Messervy, Lond. R., attd. R.F.C.
2nd Lieut. H. L. Tomkies, Sher. For., attd. R.F.C.

Died of Wounds.

2nd Lieut. F. J. Milligan, R.F.C.
Lieut. J. H. Robertsen, R.F.C.
Capt. R. J. Tipton, R.F.A., attd. R.F.C.
Major E. J. Tyson, D.S.O., M.C., R.F.C.

Previously reported Wounded, now reported Died of Wounds.

Lieut. L. V. Southwell, Sask. R., attd. R.F.C.

Previously reported Prisoner, now reported by German Government Killed or Died of Wounds.

Lieut. J. O. Beattie, B.C.R., attd. R.F.C.

Died as a Prisoner in Turkish hands.

Major R. D. de la C. Corbett, I.A., Inf., attd. R.F.C.

Accidentally Killed.

2nd Lieut. J. P. Hamilton, R.F.C.
Capt. V. P. Murphy, Nova S. Regt., attd. R.F.C.

Died.

120007 3rd Air-Mech. J. Dolan, R.F.C.

Missing (believed Drowned).

405678 Lance-Corpl. C. E. Rich, R.F.C.
8201 1st Air-Mech. P. C. Waud, R.F.C.

Wounded.

2nd Lieut. T. Allan, R.F.C.
2nd Lieut. J. W. Bell, R.F.C.
2nd Lieut. B. Bidmead, Sher. For., attd. R.F.C.
Capt. C. H. Brewer, Bedf. R., attd. R.F.C.
2nd Lieut. D. S. Broadhurst, R.F.C.
2nd Lieut. P. H. Burt, R.F.C.
2nd Lieut. S. W. Bunting, R.F.C.
Lieut. J. M. Carroll, Durh. L.I., attd. R.F.C.
2nd Lieut. E. McL. Cleland, R.F.C.
Lieut. B. A. Cooke, Alta. R., attd. R.F.C.
Lieut. D. Craik, A.I.R.O., attd. R.F.C.
2nd Lieut. T. B. Dickson, R.F.C.
Lieut. T. H. French, R.F.C.
2nd Lieut. G. Gilham, R.F.C.
2nd Lieut. E. G. Humphrey, S. Staff. R., attd. R.F.C.
2nd Lieut. T. L. Johnson, R.F.C.
Lieut. E. C. Kinghorn, Bord., attd. R.F.C.
Major L. W. Learmount, D.S.O., M.C., R.F.C.
2nd Lieut. H. V. C. Luyt, R.F.C.
2nd Lieut. P. A. MacDougall, R.F.C.
2nd Lieut. W. F. Mayoss, R.F.C.
2nd Lieut. T. McGovern, R.F.C.
2nd Lieut. S. A. Oades, R.F.C.
Lieut. C. R. Pilcher, R.E., attd. R.F.C.
2nd Lieut. R. M. Tate, R.F.C.
2nd Lieut. E. T. Taylor, R.F.A., attd. R.F.C.
2nd Lieut. F. A. Trotter, R.F.C.
115569 Sergt. F. Hopper, R.F.C.

Missing.

2nd Lieut. C. Allen, R.F.C.
Lieut. H. B. P. Boyce, Sask. R., attd. R.F.C.
2nd Lieut. R. Caldecott, R.F.C.
2nd Lieut. L. C. F. Clutterbuck, R.F.C.
Lieut. J. A. Convery, Can. Cav., attd. R.F.C.
Lieut. G. R. Crammond, Lan. Fus., attd. R.F.C.
2nd Lieut. E. P. P. Edmonds, R.F.C.
2nd Lieut. G. D. Falkenberg, R.F.C.
2nd Lieut. C. B. Fenton, R.F.C.
Lieut. J. A. A. Ferguson, R.F.C.
Lieut. C. R. H. Ffolliott, R.F.C.
2nd Lieut. C. H. Fiere, R.F.C.
2nd Lieut. A. H. Fitzmaurice, R.F.C.
Lieut. R. G. Foley, M.C., E. Ont. Regt., attd. R.F.C.
Lieut. P. La T. Foster, R.F.C.
Lieut. H. G. Gill, W. Yorks. R., attd. R.F.C.
Lieut. J. L. P. Haynes, L. N. Lancs. R., attd. R.F.C.

Capt. D. S. Kennedy, R.F.C.
2nd Lieut. J. N. B. McKim, R.F.C.
2nd Lieut. F. G. McNeil, R.F.C.
2nd Lieut. J. N. L. Millett, R.F.C.
2nd Lieut. J. W. Muir, R.F.C.
2nd Lieut. J. F. R. I. Perkins, R.F.C.
2nd Lieut. G. P. F. Thomas, Durh. L.I., attd. R.F.C.
Major L. A. Tilney, M.C., R.F.C. (2nd Lieut. Household Cavalry).
2nd Lieut. R. H. Topliss, R.F.C.
Lieut. N. T. Watson, Midd'x R., attd. R.F.C.
2nd Lieut. N. B. Wells, R.F.C.
2nd Lieut. E. A. Whitehead, R.F.C.

Previously Missing, now reported Prisoners in German hands.

2nd Lieut. G. A. C. Manley, R.F.C.
Lieut. W. B. Randell, Aus. F.C.
Lieut. G. M. Shaw, Cent. Ont. Regt., attd. R.F.C.



AIR RAIDS INTO GERMANY.

IN the House of Commons on March 19th, Mr. Joynson-Hicks asked the Under-Secretary of State for War if he can now give any details as to our recent successful air raids into Germany.

Mr. Macpherson replied: Since October we have made thirty-eight effective raids into Germany, and we have dropped 48 tons of explosives—a remarkable achievement under the circumstances. The conditions under which these raids have been carried out during the winter have been extremely difficult. In the Lorraine region, throughout the winter, it is only on rare occasions that flying can be successfully carried out.

Low clouds, high winds, rain, and snow are the normal features of the weather in this area, whilst, when the weather is otherwise fine, heavy mists lie over the valleys and render the location of targets extremely difficult. This is particularly so in the case of the valleys in which the German ironworks and factories are situated. Intense cold has been experienced, machine guns have been frozen, and there have been several cases of frost-bite. Stress must be laid on the difficulty of finding the way in an unknown country, more particularly where clearly defined landmarks are absent.

Approximately 250 flights have been made in the course of these raids, during which only ten machines have been lost.

There has been a steady increase in the number of raids carried out and the amount of explosive dropped, whilst the increased distance to which raids have been carried into Germany is most satisfactory. This is particularly so in the case of the recent raids during March, which have so far been eight in number.

I would point out that the majority of raids by British machines have been carried out in broad daylight, and photographs have been taken of the bursting bombs, placing the accuracy of the reports received of their effect beyond all shadow of doubt. Further, by attacking in daylight, it has been possible to concentrate attack on objects of actual military importance—a striking contrast to the promiscuous methods adopted by the enemy.

During the night raids our machines have descended to low heights, and fired at searchlights, trains, and railway stations. A steady increase has been observed in the enemy's anti-aircraft defences, the number of searchlights, guns and aeroplanes. These latter have been defeated with loss whenever they have attempted to intervene.

On other occasions our pilots have attacked enemy machines drawn up on the aerodromes, preparatory to making bombing raids into France. The following report on a recent raid is typical of the results obtained:—

"Detailed Report of Operations Carried out March 10th, 1918.

"Twelve aeroplanes left at 9.35 a.m. to bomb the railway stations, barracks, and Daimler Motor Works at Stuttgart. Eleven of these machines reached the objective. One machine failed to return, being seen to fire a green light on the return journey, and go down under control, apparently with engine trouble, south-east of Oberkirch.

"The following bombs were dropped on the objective with excellent results:—

3	230 lbs.
16	112 "
9	40 " (phos.)

Total.. 2,842 lbs.

"Several bursts were seen on the Daimler Motor Works and several on the railway lines. Mettingen Station was hit, and set on fire. A train which was standing in the station was also set on fire. Two bombs burst near the electric power station in the town, one beside the railway sidings, one near the gasworks, and five or six bursts in or around the Gare de Triage. Two bursts were seen by the bridges over the river and two beside a large munition factory south-east of the town. A total of thirty-six plates were exposed of Stuttgart, which have come out very well, and which show bombs bursting on objectives.

"Three enemy aircraft attacked our machines over the objective, one being a 2-seater and the other two Albatros D3 type.

"After the first combat, the enemy aircraft followed our machines, shooting at long range, and then withdrew.

"The most recent report is to the effect that our bombing machines attacked military objectives at Mannheim, on the Rhine, on 18th March. Over one ton of bombs were dropped, with excellent results. Eight direct hits were obtained on the Badische Soda Factory, causing an abnormally large column of black and white smoke to ascend. Also two bursts were seen on the docks, and one on another large factory.

"The bombers were attacked by two formations of enemy machines, of which two were driven down out of control over Mannheim, and the remainder driven off.

"Our machines all returned safely."

Mr. Joynson-Hicks: May I ask my hon. friend whether it is possible to tell the Field-Marshal Commanding how enormously proud we all are here of the work recently done by these gallant airmen?

Mr. Macpherson: I shall certainly make a point of doing that.

Mr. Billing: May I ask whether we may now consider that these raids are carried out as ordinary acts of war and not by way of reprisals?

Mr. Chancellor: Is it our policy to attack only military objects?

Mr. Macpherson: I cannot add anything to the answer which I gave.

Mr. Butcher: Will my hon. friend say whether he believes that the weather conditions in the spring and summer will enable us to bomb successfully the ironworks and other works in Lorraine?

Mr. Macpherson: I am hopeful that will be so.

Mr. Billing: Will the hon. gentleman say whether these raids are carried out by way of reprisals or as ordinary acts of war?

The Work of the French Aviators.

COMMENTING on the work of the French Flying Corps in February, the *Matin* says:—

"During February we brought down 43 enemy aeroplanes, and ourselves only lost eight machines. In 1917, we had 33 aviators, each of whom had brought down five enemy machines, while over eleven had scored more than ten victories

each. To-day we have 53 pilots, 17 of whom are 'aces,' each having over ten victories to his credit. During February, we dropped 101,000 kilogrammes (100 tons) of explosives upon German military objectives. We have maintained our technical superiority and increased our numerical superiority. The Germans have now against us two-thirds of their entire aerial strength."

THE WAR CABINET AND THE ROYAL AIR FORCE.

IN the report of the work of the War Cabinet for the year 1917 which has just been published, there is the following chapter dealing with air matters:—

The Air Service.

The year 1917 saw the passing of the Air Force (Constitution) Act, 1917, and that Act and the amalgamation of the Royal Flying Corps and the Royal Naval Air Service in a unified Air Force which will eventually result from it represents the consummation of tendencies, the workings of which can be traced throughout the brief but crowded history of naval and military aeronautics in this country.

[Then follows a brief recapitulation of the history of the Flying Services and the first Air Boards.]

It is now necessary to discuss the factors which led to the transformation of the second Air Board into the fully equipped and independent Ministry which is, at the date of the Report, in course of organisation. At the time of the formation of the second Air Board, the requirements of the two Services in the matter of aircraft were far from satisfied, and during the first six months of its existence the whole of its energies were devoted to increasing supply in order to meet those requirements. By the middle of the summer of 1917 the situation had improved so much that the Board was in a position not only to look forward to the day when the needs of the two services would have been met but also to anticipate the creation of a substantial surplus of aircraft beyond those needs. It then became necessary to take measures for the utilisation in the most effective manner of these additional craft. This gave rise to questions of policy which the Board, constituted as it was, was unable to solve. An Air War Staff became a necessity in order to consider problems of aerial offensive and defensive distinct from those connected with the operations of the Army and the Navy. The need for such a body was pointed to by the obviously increasing importance of these problems. The speed, range and carrying capacity of aircraft were reaching a stage of development almost unsuspected at the beginning of the war. It was possible to envisage from the results of bombing operations already practised on lines of communication and other places behind the enemy's lines the effect which the extension of these operations might have upon the determination of a struggle which, as regards the conflicts of the opposing armies on the Western Front, threatened to reach, if not a deadlock, at all events a condition where victory might only ensue by a long and costly process of attrition.

From the point of view of defence, the new arm presented problems pregnant with at least equal importance. The proud and ancient inviolability of these islands was being challenged in a new and startling fashion, and the seriousness of the problem was added to by the fact that the geographical position of the capital of the Empire rendered it particularly inviting to attack from the air. The menace of the lighter-than-air craft seemed in a fair way to be overcome, but it was clear that the possibilities of attack by bomb-carrying aeroplanes were not yet either measured or mastered, and any arguments based on the assumption that the uses of aircraft were purely ancillary to military or naval operations were being refuted by the logic of fact and experience. The Air Board, however, possessed neither the staff nor organisation to enable it to cope with these problems. The President was without that body of technical advice which alone would enable him to form a correct judgment as to the relative importance of the different methods of employing aircraft. For technical advice of this kind he could look only to the naval and military members of the Board who sat there mainly as representatives of the Board of Admiralty and of the Army Council.

These considerations led to Lord Cowdray's addressing, on July 28th, 1917, to General Smuts (as the member of the War Cabinet charged with the general supervision of air matters) a letter setting forth his view that the Air Board should be turned into a permanent Ministry, that it should have a War Staff to consider the best use to be made of aircraft not needed directly by the operations of the Army and the Navy, and that the surplus aircraft should be considered a distinct unit from the air contingent attached to the Expeditionary Force.

On August 24th the War Cabinet decided to accept in principle the establishment of an Air Ministry, and also decided that a further Committee should meet at once to work out a scheme for giving effect to this decision. This body consisted, under the chairmanship of General Smuts, of representatives of the Admiralty, War Office, Treasury and Air Board, and was known as the Air Organisation

Committee. Its appointment was a necessary administrative corollary to the decision taken by the War Cabinet on the question of principle. The absorption of the two branches of the Air Service in a single service would at any time have been a matter of complexity, and the task was one of which the delicacy was enhanced by the fact that it was to be brought about in the middle of a great war and at a time when those concerned in the amalgamation were carrying a burden of responsibility and administrative work, the daily performance of which could suffer no interruption or delay. It was essential, therefore, before any legislative action was initiated that the ground to be covered should be carefully plotted out, and this was the task which fell to the Air Organisation Committee.

The nature of its enquiries may be indicated under the following statement of some of the questions which were dealt with: (1) The legislation needed for the establishment of an Air Force and of an Air Council to administer it; (2) the constitution of the Council, its membership and the appointment of duties between the members; (3) the organisation of the Air Ministry and the duties of its officials; (4) the question of supply in all branches, the rates of pay, conditions of service and pension allowances, the relation between the Air Ministry and Air Force and the War Office and Admiralty and Army and Navy; (5) the preparation of King's Regulations and other matters relating to discipline &c. On the majority of these questions the Air Organisation Committee was able to arrive at an agreement with the departments concerned.

It is, however, only right (if a just perspective is to be maintained) to emphasise the importance of the contribution to the unification of the two Services which had been made when their headquarters' staffs became housed under one roof. The opportunities for daily conference on almost every subject of aeronautical administration which naturally ensued—together with the link provided by a joint system of supply and design—was probably an essential preliminary to the task of unification.

Ministry of Air

Following upon the discussions of the Air Organisation Committee, the Air Force Bill was introduced into the House of Commons in November. It met with no opposition of principle in either House, and received the Royal Assent on November 29th. The scheme of the Act contemplates that the whole of the personnel and equipment of the R.F.C. and R.N.A.S. should be in due course absorbed by the Air Force under the control of an Air Council presided over by a Secretary of State and exercising functions analogous to those of the Army Council.

It was fortunately not necessary to provide the new force with a complete and original code of administration co-extensive with the codes by which the Navy and Army are governed and which are made up of an accretion of centuries of experience. The actual administration of the Air Force would clearly offer many analogies to that of the Army, and it was found practicable to adopt with modifications the Army (Discipline) Act to regulate the discipline of the Air Force. Similarly, the Crown is empowered by Section 13 of the Air Force (Constitution) Act to apply with any necessary modifications to the Air Force any of the various enactments relating to the powers, rights and duties, of the Army or of its officers and men.

It was not to be expected that the new department could spring forth fully armed from the decisions of the Legislature. The provisions of the Air Force (Constitution) Act represented the fruits of a careful preliminary exploration by the Air Organisation Committee, but there remained important steps in the detailed organisation of the new Force which could not be undertaken until the Bill became law. One of the first steps in re-organisation was a readjustment of the positions of the Technical Department of the Air Board, which was responsible for the design of aircraft, and the Aeronautical Supply Department, under the Ministry of Munitions, which was under the charge of Sir William Weir, who was also a member of the Air Board. The changes now made unified the functions of the two Departments. The next step was to set up the Air Council and to define the duties of its members. This was done by Orders in Council issued on December 21st, 1917, and January 2nd, 1918. On the latter date Lord Rothermere (who had been appointed President of the Air Board on November 23rd, following Lord Cowdray's resignation) was appointed Secretary of State. The appointments of the other members of the Air Council were announced at the same time: Lieut.-Gen. Sir

David Henderson, K.C.B. (additional member and Vice-President); Major-Gen. Sir Hugh Trenchard, K.C.B. (Chief of the Air Staff); Rear-Admiral Mark Kerr, C.B. (Deputy Chief of the Air Staff); Commodore Godfrey Paine, C.B. (Master-General of Personnel); Major-Gen. W. S. Brancker (Comptroller-General of Equipment); Sir William Weir (Director-General of Aircraft Production in the Ministry of Munitions); Sir John Hunter, K.B.E. (Administrator of Works and Buildings); Major J. L. Baird, C.M.G., D.S.O., M.P. (Parliamentary Under-Secretary of State). The Air Council is now engaged, in consultation with the Admiralty and the War Office and other Departments concerned, in completing arrangements preparatory to the assumption of full administrative and executive responsibilities.

It is convenient here to refer to two matters in which some misunderstanding may have existed as to the seat of responsibility:—

1. Home defence against air raids.
2. The control of lighter-than-air craft.

(1) The former is under the control of the Field-Marshal Commanding the Home Forces, and the Air Council is not responsible for it. Aircraft, anti-aircraft guns and search-lights for the defence of London have been united under the immediate command of a single General Officer. Elsewhere in the United Kingdom the guns and lights are under the local General Officer Commanding-in-Chief, while the aircraft has been grouped under the General Officer Commanding a Brigade. Section 3 of the Air Force Constitution Act, however, provides that units of the naval or military forces engaged in defence against aircraft may, by arrangement with the Admiralty or Army Council, be attached to the Air Force.

The foregoing refers mainly to aeroplanes and seaplanes, the airship and, to a lesser extent, the kite balloon, having been administered on somewhat different lines.

(2) Up to the end of December, 1912, the Army and the Navy had both been experimenting with airships, but at that date the Army Council decided to relinquish this work, and consequently the military airships and personnel were transferred to the Admiralty on January 1st, 1913, and henceforth airships were experimented with and administered solely by the Admiralty.

At the outbreak of war there were only five small airships in existence, and little progress was made until March, 1915, when the first S.S. (Submarine Scout) type airship was produced and a programme embarked upon. Since that date considerable development has taken place, and non-rigid airships form an important part of the anti-submarine measures, while rigid airships are being constructed by the Admiralty with a much wider range of action than is possible for the smaller non-rigid aircraft.

On the formation of the Air Force, though the principle was agreed to that ultimately airships should be transferred to the new authority, it was decided that until this branch of the service had become settled on a more solid foundation the responsibility for the design, production and administration, should remain with the Admiralty. The personnel will be transferred to the Air Force while remaining with the Admiralty for production and administrative purposes.

The kite balloon was originally taken up by the Navy in March, 1915, and their example was followed by the Army, whose first three land sections in France were manned by naval personnel. It was later arranged that the second Air Board should be responsible for the whole of the supply of R.F.C. requirements, though the Admiralty remained responsible for the provision of a considerable portion of the demands for naval kite balloons. On the formation of the Air Force the whole responsibility for kite balloons will pass to the new body.

Reference should be made to some of the organisations subsidiary to the central authority whose evolution has been traced in the preceding paragraphs.

Inventions.—The administrative separation of the two branches of the Service reflected itself in the arrangements for dealing with aeronautical inventions, the consideration of which was divided between the Board of Invention and Research under the Admiralty, the Munitions Inventions Department under the Ministry of Munitions, and the Directorate of Military Aeronautics under the War Office. This division of responsibility possessed obvious disadvantages in a matter where the co-ordination of all sources of knowledge and experiment was of prime importance, and one of the duties with which the first Air Board was charged was the organisation of a system of further interchange of ideas on air problems between the two services. Proposals to this end were put forward by Lord Curzon without securing acceptance from some of the parties whose concurrence was

essential, and a settlement of the problem was not reached until the middle of 1917, when an Air Inventions Committee was appointed by Lord Cowdray, to which was transferred all duties in connection with the examination of inventions relating to heavier-than-air craft. This Committee works in close co-operation with the Advisory Committee on Aeronautics.

Civil aviation.—A Committee, known as the Civil Aerial Transport Committee, was appointed in April, 1917, under the chairmanship of Lord Northcliffe, to consider:—

1. "The steps which should be taken with a view to the development and regulation, after the war, of aviation for civil and commercial purposes, from a domestic, an Imperial and an international standpoint.
2. "The extent to which it will be possible to utilise for the above purposes the trained personnel and the aircraft which the conclusion of peace may leave surplus to the requirements of the naval and military air services of the United Kingdom and Overseas Dominions."

The Committee at the outset divided its inquiry into five branches, and entrusted each to a special committee, as follows:—

1. Questions of law and policy.
2. Technical questions as to the performance of aircraft and the requirements of aerial services.
3. Business questions relating to the position of the aircraft manufacturing industry after the war.
4. Labour questions.
5. Problems of research and education.

Reports by all the five Sub-Committees have been drawn up and are now under consideration by the Main Committee.

Medical research.—A Medical Research Committee appointed in March, 1917, has performed valuable services to the investigation of the various physiological phenomena produced by flying at high altitudes and kindred subjects. It has been found by experience that flying men are subject to many peculiar disabilities, and considerable progress has been made in the methods of prevention and cure of these disabilities.

Supply of Aircraft.

The above recital indicates generally what steps have been taken in matters of administration and control. It should be supplemented by some general account of the measures taken as regards supply of aircraft and the development of that supply.

In endeavouring to describe the measures taken to meet the aircraft needs of the Navy and Army, the writer is at once confronted by the fact that the information desired by the country is precisely the information desired by the enemy. What the country wants to know is what has been the expansion in our Air Services; whether we have met and are meeting all the demands of the Navy and of the Army, both for replacement of obsolete machines by the most modern types and for the increase of our fighting strength in the air; what proportion of the national resources in men, material and factories is being devoted to aviation; what the expansion is likely to be in the future. These are precisely the facts which we should like to know with regard to the German air service, and for that reason it would be inadmissible for us to supply Germany with corresponding information about ourselves by publishing a statement on the subject.

It can be said that the expansion of our Air Services is keeping pace generally with the growing needs of the Navy and the Army.

The brilliant part played by the Royal Flying Corps and the Royal Naval Air Service in the battles of the Somme, Vimy, Messines and Ypres has been described by the Commander-in-Chief, who has also borne frequent testimony to the inestimable value of the work performed daily and nightly by the two air services. It is fair to say that not even the well-known superiority of our airmen over those of the enemy would have enabled them to have earned the Commander-in-Chief's praise in so unstinted a measure unless they had been supplied with satisfactory machines and equipment from home. It is rather the fashion to criticise the quality of our machines. Most of the critics, however, are ignorant of the technical and manufacturing difficulties which have to be overcome in order to keep up a constant and increasing supply of the most up-to-date machines. Not only are the technical difficulties and the resultant research and experimental work formidable in themselves, but the task of building up in war time, without seriously affecting the requirements of other services, a new industry of a most highly skilled character necessarily puts a heavy strain upon the organising and manufacturing ability of the country. The growing realisation of the increasing importance of aviation

as an artificer of victory has recently been reflected by the concession of first priority to labour and materials required for aircraft production.

The nature of the duties performed by the Royal Naval Air Service, both in conjunction with the fleet and from naval bases, makes secrecy essential to success. It is, unfortunately, inevitable, therefore, that the public should remain in the dark on this subject; but the Germans, who in this matter are perhaps the best judges, have good reason to know and to regret the great and growing activities of the Royal Naval Air Service. All that has been said regarding the difficulties of supplying the requirements of the Air Forces operating over the land applies equally to the supply of those which operate over the sea. In both cases difficulties are being overcome and the outlook is improving.

The science of aeronautics is in a state of constant and rapid development; improvements in engines, aeroplanes and their numerous accessories are constantly being worked out. But the interval between the discovery of an improvement and its introduction into the service is, owing to technical considerations, very much longer than is commonly supposed. Experience shows that, as a rule, from the date of the conception and design of an aero-engine to the delivery of the first engine in series by the manufacturer, more than a year elapses; the corresponding period for an aeroplane is about one half as long. Consequently, plans have to be laid for a long period ahead, and these plans are liable to be upset by many uncertain factors. The hopes based upon the promising results given by the first experimental engines of a new design are frequently disappointed owing to difficulties of bulk manufacture or to defects only developed after long trial in the air; new types of aeroplanes favourably reported on when first tried are found on longer experience not to give complete satisfaction, and yet it is impossible, if we are to keep ahead in the keen struggle for aerial superiority, to wait for full experience before placing orders. Risks must be run, and new types must be adopted at the earliest moment consistent with reasonable assurance that they will constitute a substantial improvement on what is already in use. Orders must be placed, moreover, for considerable numbers and for delivery over many months, as the large output required for our present flying services can only be obtained by bulk orders permitting a high degree of sub-division of work.

The next step in the problem is the balancing of the engine and the aeroplane programmes. Owing to the much longer period required for the production of engines than of aeroplanes, orders for the former must be placed for relatively long periods ahead, before it is known what types of aeroplanes will be required when the engines become available.

The problem is complicated by the fact that manufacture and delivery rarely if ever proceed in accordance with anticipation. The output of a particular type may be delayed

for weeks or even months owing to some technical difficulty of manufacture. Moreover, as replacement of losses and expansion are proceeding simultaneously in the flying services, and the rate of wastage in different types of engines and of aeroplanes varies considerably according to circumstances, it is impossible to forecast with accuracy what engines will be available for the equipment of new types of aeroplanes after wastage has been made good. Nor is it possible to any great extent to adjust the programme by modifying orders once placed without disorganising supply. The problem does not end here. Whenever a new type is introduced provision must be made for accumulating a sufficient "head" of spare engines, spare aeroplanes and spare parts of innumerable kinds, to keep the squadron to be equipped with that type in a condition to make good the day-to-day wastage and carry out the constant repairs required.

Such being the nature of the problem, it is satisfactory to be able to record that during the year 1917 not only was the number of squadrons of aircraft on the various fronts increased in a notable degree, but there was a complete replacement of machines and engines of the older types. The very great increase in output which is being obtained has placed a considerable strain on the workers in the aircraft and aero-engine factories of the country, a strain which is being met on the whole in a satisfactory manner.

The difficulties in connection with production are aggravated by the competing claims of many different types of aero-engines. Standardisation is the ideal, but it is obviously difficult of attainment having in view the importance of not losing time in production and at the same time of keeping abreast with the very latest developments necessitated by the need for constant increase of horse-power and higher performance. The Air Council are most keenly impressed by the need for concentration on a few approved engines, and they have the whole question of the reduction of numbers of types under constant and careful consideration.

Attention was drawn, on more than one occasion, by manufacturers to the importance of maintaining the interest of workers in aircraft factories in the highly important but generally monotonous work on which they are employed. Engaged, as they frequently are, on the production by a repetition process of some small part of an aeroplane, these men and women find it difficult to realise that they are contributing effectively to one of our most valuable instruments of warfare. It was accordingly arranged that Captain Ewart, R.F.A., well known as a writer by the name of "Boyd Cable," should visit various squadrons at the front and gather materials and photographs for lectures concerning the exploits performed with various types of aircraft for delivery to the workpeople engaged on the manufacture of those particular types. Captain Ewart delivered several series of lectures which, judging from the reports received from the factories concerned, proved a very great success.

Fatal Accidents.

SGT. STANLEY EDWARDS, R.F.C., was killed at Brooklands on March 18th. After looping the loop the machine crashed to the ground.

Caught in a mist which came up suddenly, Lieut. H. L. Barlow, R.E. and R.F.C., crashed to the ground and was killed on March 20th.

A verdict of Accidental Death was returned at an inquest on March 23rd on Prob. Flight Officer Lewis Brown, who was killed at Eastbourne. He was seated in a biplane preparing to rise when another machine landed on top of him and he was killed instantaneously.

Flight Sergt. Reginald C. Pasque, a cousin of Lord French, was killed in an aeroplane accident at Hounslow on March 22nd.

An aeroplane crashed into the steeple of the parish church of St. Ives (Hunts) on the evening of March 23rd, and both the machine and the pilot fell through the roof of the building. The pilot was killed, and the upper part of the steeple was demolished.

Lieut. M. W. Doyle was flying near Shenley, Hertfordshire, on March 23rd, when his machine fell 300 ft. and he was killed.

Fatal Accident in Egypt.

SECOND LIEUTENANT A. P. DALE, who was the Unionist agent at Chesterfield, has been accidentally killed while flying in Egypt.

Killed While Helping.

A YOUTH whose name is believed to be Hayward was killed near Acton on March 23rd. Lieut. Sadler, R.F.C., was flying to North-West London, when he experienced engine trouble, and had to descend in a meadow. The youth, who was a mechanic at an aerodrome, went to the aviator's

assistance. There was some difficulty in restarting the machine, but suddenly the propeller flew round and struck the lad, whose ear was cut off. He died almost instantly.

The Women's Royal Air Force.

It has now been decided that the new women's service—the Penguins—formed to release men in the R.F.C., will be officially known as the Women's Royal Air Force. Lady Gertrude Crawford, who has been appointed as its head, will be known as Chief Superintendent.

The terms of service and conditions are based on those of the W.A.A.C. and the W.R.N.S., and recruits must enrol for the duration of the war. About 300 officers are required, who will be enrolled by the Professional Registry, Queen Anne's Chambers, and the ranks will be recruited by the Ministry of Labour Employment Bureaux or recruiting offices. The uniform has not yet been decided upon, but it is practically settled that it shall be of khaki and similar to that of the W.A.A.C.'s. At present the force will be largely immobile, but a mobile section will be formed, and the ranks will live in hostels at the stations to which they are attached.

The Queen at Messrs. Gwynnes Works.

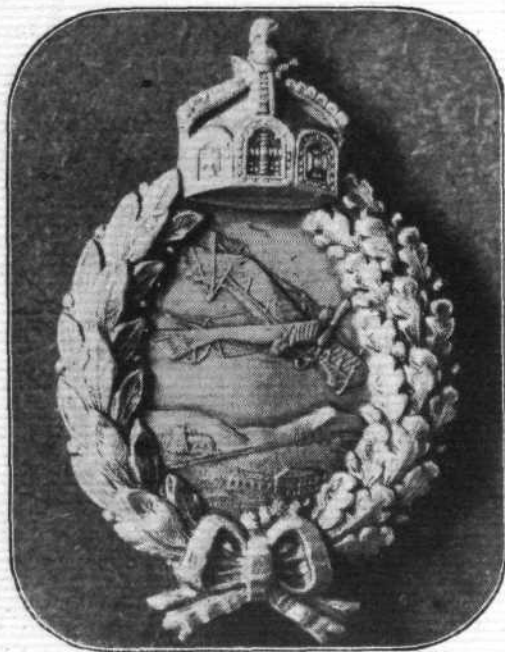
It was announced in the Court Circular on March 20th that the Queen, accompanied by the Prince of Wales and the Prince Henry, and attended by the Lady Mary Trefusis and the Earl of Cromer, visited the Works of Messrs. Gwynnes, Ltd., and was received by Mr. N. Gwynne (Managing Director), Mr. J. Dewar (Director), and the staff. Mr. Cannell (general manager), Mr. Sumner (works manager) and Mr. Wilkes (secretary) were also present, and Major Davson, of the Department of Aeronautical Supplies, was in attendance.

It will be remembered that the King visited the works some little time ago.

AIRISMS FROM THE Four Winds.

IF it is still considered important that localities where the Huns actually drop their bombs on London should not be identifiable—and it would appear still to be desirable—would it not be as well to suppress full names at the inquests? There is such a thing as a Kelly's Directory in existence, we have heard, so there you are.

WHAT is it? The silver badge, of which the photograph annexed is a reproduction, was taken last year from a German



What is it?

N.C.O. pilot by one of our flying officers, who has obtained the M.C., after shooting down the German. The R.F.C. officer writes:—

"Can you inform me at all as to its origin or meaning? I noticed, in your issue of September 6th, 1917, that what appeared to be the same type of badge was fixed to the tunic of a Captain Kleine, leader of a German bombing squadron."

The maker's name on the back of the badge is C. E. Juncker, Berlin. Can any of our readers give us the desired information?

APPROPOS the finding of "rest quarters" for that demi-god, the Hun officer in the more actively air-raided localities, that good old sporting comedy of "when is a reprisal not a reprisal?" has been revived with vigour, although maybe with a more subtle touch. Lord Newton last week took the subject up with discretion at an interview, when he explained that the housing of German prisoners of war in areas which have been, or may be, raided by German airmen is not, strictly speaking, to be regarded as a reprisal. It was true that Germany had sent British officer prisoners to such cities as Karlsruhe, but it was claimed that this had been done, not for the purpose of exposing them to the bombs of British or French airmen, but because there happened to be suitable accommodation there.

"Reprisals," said Lord Newton, "is not the exact word to use, even if we are in fact following the German practice. I think," he continued, "too much is being made of this matter, for, after all, there is nothing new in the presence of German prisoners in areas subject to bombardment. People seem to forget that there have long been in London huge camps filled with German prisoners where bombs are as likely to fall, when raids take place, as in any other part of the metropolis."

QUITE good news, taken all round, and it is to be hoped that London surroundings will be considered as increasingly the most suitable for prisoners of war from Donnington Hall and other places of that ilk. It must be abominably boring to such superior supermen to be stuck away amidst such tame surroundings. In this connection, Deputy Abel Ferry in a recent issue of the *Petit Journal* goes a step further. What he suggests is:—

"Let us take distinguished German prisoners and distribute them everywhere in the squares, near monuments, factories, parks, railway lines, and at other suitable spots. Their custodians being sheltered, they themselves should be compelled to remain standing in the open air when the siren sounds the alarm."

The one difficulty which emerges in this scheme, it appears to us, is the means to employ to ensure that these hostages shall remain where they are actually placed, without risking lives of our own kith and kin, which are of some count still.

A NICE, gentlemanly antidote has also been given voice to by Brig.-Gen. Page Croft, M.P., who would like to see "for every home, for every working woman and little child done in by German bombs in this country, a whole street in Cologne blotted out." The cathedral city is not over far from Coblenz, and no doubt a trial run on account in this direction will not be very long in maturing. Half a dozen streets might be tackled by way of a jump off, before any calculations are arrived at as to clearing up the job, or we are afraid Cologne would be found to be hardly big enough for the job and so get missed altogether in the ultimate selection.

AFTER Hours. "Corisande," in the *Evening Standard*, writing of a recent Waacs and Wrens dinner, relates how one scarcely noticed the scarcity of men at the dinner in honour of the Sister Services at the Lyceum Club, as so many of the women present were in blue or khaki. There wasn't any of the promised sky-blue and silver of the women's section of the Flying Corps, for Lady Gertrude Crawford, the one "Penguin" yet recruited, came in orthodox evening dress. Dame Katherine Furse, replying to the "Sister Services" toast for the Wrens, said that they wanted nothing in the shape of snobbery in the women's naval service, and she hoped that good types of women would join as ratings.

The most impressive speech of the evening, "Corisande" continues, was that of the Hon. Mrs. Haverfield, who spoke of the earliest war organisations of women, such as the Women's Emergency Corps and the Scottish Women's Hospital, whose work was rejected by officialdom in their own country, and who were told that they were "disgracing our splendid men by dressing up in khaki." She confessed to some amusement, after those experiences, to find herself now at a "Sister Services" dinner. Mrs. Haverfield also declared that she would like to see women doing other work than that of cooks and clerks in the Army, as she knew the bravery and endurance of which women were capable. Even the low-necked, pearl-bead, and powdered-nose brigade—women you "wouldn't think worth tuppence" when you saw them on the street—were capable of wonderful heroism under fire, as her experiences abroad had proved.

MANY stories have from time to time got into circulation of the huge increased building by the Germans of super-Zeppelins and *per contra* of their being abandoned altogether. Either way they were always rightly suspect of enemy camouflage, to serve their own purpose. A side-light, which may not be a blind, is now forthcoming upon this subject in the latest annual report of the German Airship Company, of Frankfurt-on-Main, which indicates that the company has almost entirely abandoned the construction of airships.

According to the *Frankfurter Zeitung*, the year's profits on construction have fallen from £6,795 to £2,794, "because the company had to abandon for the most part its former branch of construction." The airship sheds belonging to the company are valued at only £7,800, as compared with £16,350 a year ago. It is stated that "since the autumn

of 1917 the company has devoted itself to a new field of work, which promises reasonable profits."

Anyway, even £6,795 profits doesn't sound as if the company had built all the Hun gas-bags.

A WEEK or so ago "Paul" in the *Mail* put up a query as to the why and wherefore of the strings of green balls with which the Germans were so persistently filling the skies without, apparently, any set purpose whatever. In a recent issue of our contemporary, in another article upon "How the Airman finds his Way in Night Flying," "Paul" apparently supplies, in part, an answer to his own enquiry. He suggests that the Hun raider, when returning to his aerodrome, is assisted by, in addition to aerial lighthouses, these green mysteries. They use, he says, their "green-ball" machines for navigation and fire a fixed number of "balls" on a chain, every five minutes at certain fixed places. As these mount to 10,000 ft., it is highly probable that those fired from the Belgian coast can actually be seen by German machines high over London, who then have only to steer in the direction of these recurrent signals to "hit" their coast at a known spot.

THE influence of our new Air Force must by degrees permeate in many directions. It crops up in connection with deputy lieutenants, in a bill to amend the law with regard to the qualifications of deputy lieutenants, introduced by Lord Derby in the Lords. This bill provides that so much of the Militia Act, 1882, as prescribes the qualifications to be possessed by persons appointed to be deputy lieutenants in Great Britain shall cease to have effect, and after the passing of this Act a person may be appointed to be a deputy lieutenant of a county in Great Britain if he possesses the following qualifications:—

(a) He must have a place of residence in the county or within seven miles thereof;

(b) He must be shown to the satisfaction of a Secretary of State to have rendered worthy service as a member of, or in a civil capacity in connection with, his Majesty's naval, military, or air forces.

At the Guildhall the magistrate asked "What is a dud?" to the great diversion of the court. It is unquestionably slang, and is perhaps the singular of "duds," which originally meant rags. Like many other slang words, however, it is very probably of ancient origin and honourable descent, for it may have been connected with the Old English word "dodden," to lop, a doddyd tree being one lopped of its branches, and, therefore, presenting a very ragged appearance. —D.C. "Office Window."

FOLLOWING an article a few weeks ago in *FLIGHT* upon "The Post War Aeroplane" Pte. N. Banks wrote us from an auxiliary military hospital near Manchester, that from

this article and an occasional picture of a Fokker biplane, he was prompted to ask us and "old readers to hark back to the military trials of some years ago, before the war. There was a small biplane entered, called the Piggott biplane, and this machine was a small one with a very small gap and the top of the fuselage was on a level with the top plane, and the pilot was situated in exactly the same way as the present-day machine I mentioned. This Piggott biplane was somewhat ridiculed by many, but you see it has proved to be the fore-runner of the 'Post-War Machine.'"

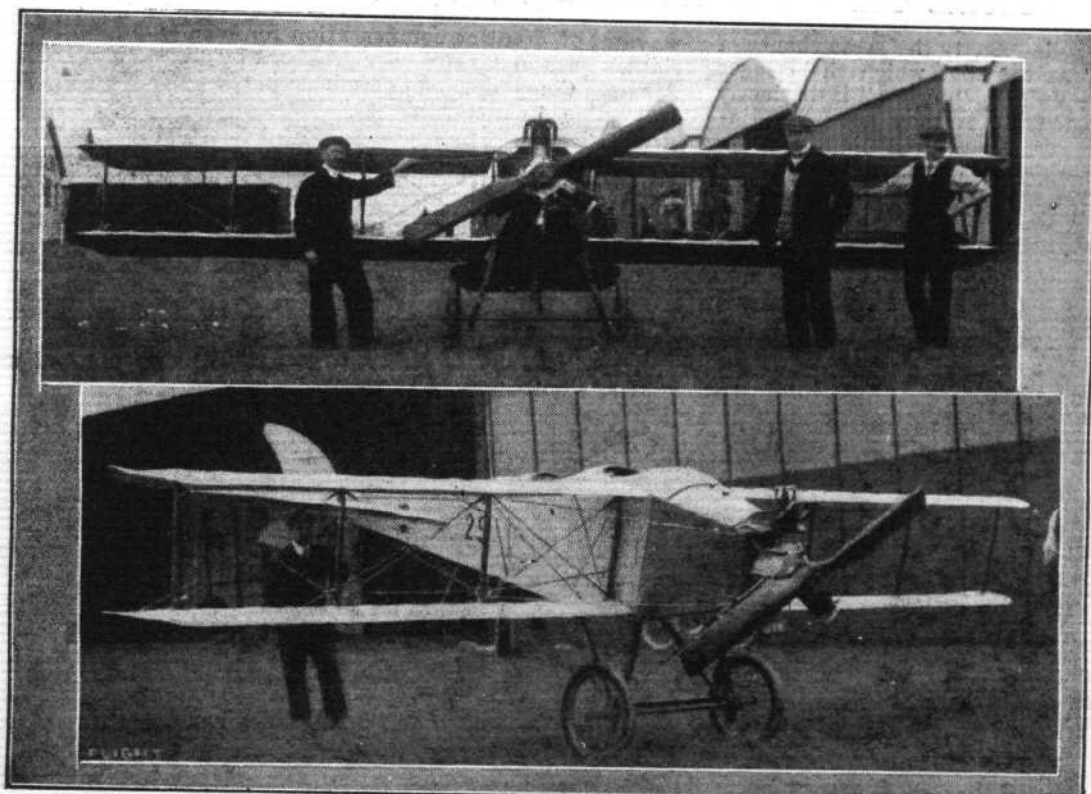
THE reference of Pte. Banks was, we thought, sufficiently suggestive to justify our turning up to our old photographs, and from these we reproduce on this page a couple of views of the little Piggott, which corroborate our observant correspondent's views.

FROM the D.C. "Office Window":—

"It takes but a few short minutes for a Gotha to approach London from the mists of the North Sea," says a contemporary. "Now, the Germans have not yet sent us a Gotha which can do more than 70 miles an hour, and great increase of power is necessary to heighten the pace and increase their altitude. The distance between London and the sea is over 50 miles. That allows ample time for the firing of the maroons, and after the maroons their is abundant leisure for us to take shelter. Big bombers will fly faster and higher, but the fastest and highest will not be German."

SEVERAL times the German Leagues have told the truth regarding the Huns' very gentle and innocent war-aims, in much plainer language than is indulged in by the Junker and other comouflagers. This time the German Navy League have, in a circular they have just issued, defined the guileless intentions of the Central Powers. After clearly claiming that the coast of Flanders is the road to London, the heart of England, &c., the League circular explains that possession of the Flanders coast is particularly essential for future air-raids on England. "It is obvious," it says, "that our aircraft cannot do without the coast of Flanders for their attacks upon England and also for their reconnaissances. Possession of the coast means an extension of the effective range of both our military and our air forces; our naval air forces simply cannot do without it." Maybe they'll have to, just the same.

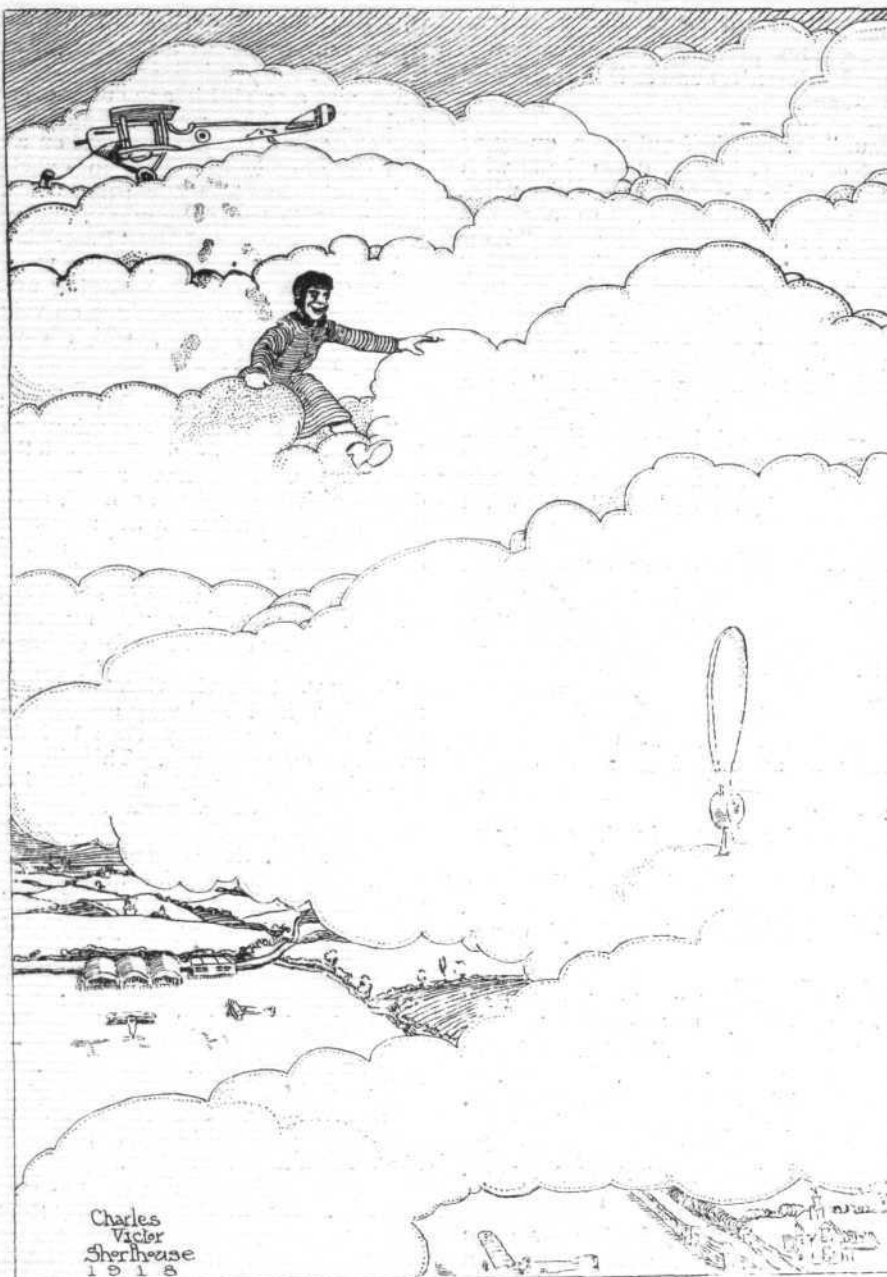
THAT story by Mr. Macpherson, Under-Secretary for War, last week in the Commons, of our bombing exploits on the German hives was intensely exhilarating. As a beginning, just to get our hand in and as an earnest of favours to come, it was quite a healthy recital, especially considering the number of other directions which are not being neglected by our Air Services. By the time we really get going the Huns, indeed, will have reason to apply the words of that great German poet Shakespeare (the Kaiser claimed him, so it must be so), "Hold, enough." By that time also we may find our American



The pre-war Piggott small-gap biplane referred to by Pte. N. Banks.

Allies joining in the fun, so that the *Wacht am Rhine* should be a pretty big reality from end to end. Hoch!

THAT retaliation in very great strength may be expected against London is natural now the Germans realise that they really have once again carried matters too far for even British humane scruples. So, after all, the new "curfew" decree is a distinctly wise move (but why not have stuck to the 9.30 instead of an hour later, just because someone "batted" in?), eliminating not only the risks of unsafe officially recognised crowded raid-shelters, but the much more dreaded consequences of small-pox and other loathsome plagues which appear to be a natural aftermath of close proximity to the alien population which chiefly patronise these pits of contagion. As has been so repeatedly pointed out, those who are within their own four walls stand a hundred to one better chance of coming off scatheless, by remaining there, than those who begin rushing about to bury themselves in some very doubtful "safe" shelter, which stands exactly the same chance of receiving the next "egg" as the spot which the refugee may just before have left. Yes, the "curfew" is distinctly sound in principle, although truly it may not spell in-



FLYING TERMS ILLUSTRATED.—The lost prop.

creased prosperity to the bloated restaurant profiteering shark, who has battered on the public more and more during the war, and whose greed has reached its climax with the recent ration cards. How they "work" it, goodness only knows. A stand should be made by black-listing the more barefaced, so that officers and others who are either restricted to maximum amounts, or have not the munition profits to draw upon, which now would appear to be so universal, may give these places a miss in baulk, and not get landed in the quandary of the party of R.F.C. officers who recently began dinner with melon and soup, and then found the only other thing left they could top up with was the proverbial toothpick.

It is perhaps fortunate for those unlucky folk who happen upon damage to property on land caused by the explosion, whether intentional or otherwise, of mines, that the Government Aircraft and Bombardment Policy is in being, as through this channel has now been found an easy way out of granting compensation for such explosions, upon similar lines to damage brought about by aircraft raids. The Air Raid Compensation Committee is the authorised body to deal with any claims under this head.



THE ROYAL VISIT TO THE CLEMENT-TALBOT WORKS.—A group during the tour.

INTERNATIONAL AIRCRAFT STANDARDS.

(Continued from page 321.)

3N10—Specifications for Babbitt Metal for Bronze-backed Bearings.

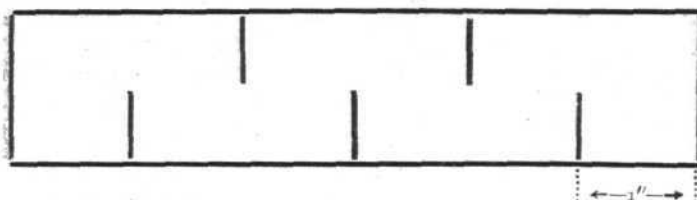
GENERAL.—1. The general specifications, 1G1, shall form, according to their applicability, a part of these specifications.

MATERIAL.—2. The composition of the material shall be as follows :

Constituent	Desired Per cent.	Allowable variation Per cent.
Tin	91.00	90-92
Antimony	4.50	4-5
Copper	4.50	4-5
Lead, maximum20	—

SAMPLE FOR ANALYSIS.—3. (a) The inspector shall select one ingot from each lot of 25. The manufacturer shall melt this ingot in a clean ladle and cast therefrom one or more sample bars 6 in. long, 1 in. wide, and not more than $\frac{1}{4}$ in. thick.

(b) Saw cuts shall be made in each sample bar, as shown in the diagram below. The cuttings shall be thoroughly mixed and must be free from iron and dust. Samples for analysis shall be taken from the mixed cuttings.



MANUFACTURE.—4. (a) The babbitt metal shall be made from lake or electrolytic copper conforming to the I.A.S.B. specification 2N2 and from the best commercial grades of tin and antimony.

(b) No scrap shall be used other than that produced in the manufacturers' own plants and which is of the same composition as the material specified.

3S33—Specifications for Heat-Treated Alloy Steel Forgings and Stampings.

(120,000 lbs. per Square Inch Tensile Strength.)

GENERAL.—1. The general specifications, 1G1, shall form, according to their applicability, a part of these specifications.

MATERIAL.—2. The steel from which these forgings or stampings are made shall conform to I.A.S.B. specification 3S4.

MANUFACTURE.—3. Heat Treatment.—(a) Forgings or stampings should be annealed before heat treatment.

(b) Forgings or stampings which fail to meet the physical tests may, at the option of the purchaser, be reheat treated.

WORKMANSHIP AND FINISH.—4. (a) The forgings and stampings must be uniform in quality, free from pipes, laps, cracks, twists, and seams, and must have a workmanlike finish.

(b) A forging or stamping may be rejected at any time because of injurious defects or faults which are revealed by manufacturing operations, notwithstanding that it has previously passed inspection. Such rejected forgings or stampings shall be returned to the manufacturer at his expense. This clause shall not apply to materials fabricated after export.

PHYSICAL PROPERTIES AND TESTS.—5. (a) The heat-treated forgings or stampings shall have the following physical properties :

Tensile Test.—(b)

	Pounds per square inch	Kilograms per square milli- metre
Minimum tensile strength	120,000	84.3
Minimum yield point	95,000	66.8
Minimum elongation in 2 inches or proportional gauge length	18 per cent.	
Minimum reduction of area	50 per cent.	

Impact Test.—(c) When impact-testing machines of the pendulum type are available, tests shall be carried out if required to determine the specific impact work of rupture in foot-pounds (or kilogrammetres). Results markedly lower than the average for this type of material will be sufficient cause for further investigation (or reheat treatment) of the material.

Brinell Hardness Test.—(d) The Brinell hardness test shall be made after the tensile test has been met. The procedure shall be as follows :

(1) Forgings with a Prolongation for Tensile Test Specimens : A hardness test shall be made on the prolong and on the opposite end of the forging. The hardness values obtained must agree within 3 per cent. Hardness values of other forgings in the same lot must agree with the average of the two test values within 3 per cent.

(2) Forgings or Stampings without Prolongation : Hardness tests shall be made on the forgings or stampings selected for the tensile test and must agree within 3 per cent. The hardness values of other forgings or stampings in the same lot must agree with the average of the values so obtained within 3 per cent.

(3) Forgings or Stampings from which a Tensile Test Specimen can not be procured : A hardness test shall be made on the forged bar representing the forgings or stampings. The hardness values of the forgings or stampings in the lot must agree with that obtained on the bar within 3 per cent.

SELECTION OF TEST SPECIMENS.—6 Forgings or Stampings weighing 6 lbs. (3.7 kg.) or over.—(a) If desired, each piece may be required to have a prolongation for the tensile test. Two per cent. of the forgings or stampings in each lot shall be subjected to the tensile test, unless a tensile test is specified for each forging or stamping.

Forgings or Stampings weighing less than 6 lbs. (3.7 kg.) and of Suitable Section for securing a Tensile Test Specimen.—(b) Two per cent. of the forgings or stampings shall be taken for the tensile test.

(c) Forgings or stampings from which no tensile test specimen can be secured shall be represented by a bar forged from the same material and to the ruling section of the forgings or stampings in the lot. The bar must be heat treated with the lot which it represents.

(d) At least one tensile test shall be made for each lot of 50 forgings or stampings.

(e) A hardness test may be required on each forging or stamping offered. At least 25 per cent. of the pieces in each lot shall be tested for hardness.

(f) All the forgings or stampings in a lot shall be heat treated at the same time, and if possible shall be from the same heat of steel.

DIMENSIONS AND TOLERANCES.—7. The forgings and stampings shall conform to the dimensions on the drawings within the tolerances specified. Surfaces which are to be machined shall admit of finishing to the required dimensions without leaving trace of the original surface.

PACKING, SHIPPING, AND DELIVERY.—8. Small forgings or stampings shall be boxed for shipment ; the gross weight of individual boxes must not exceed 220 lbs. (100 kg.). Each kind and lot of forgings or stampings shall be kept separate as inspected.

3S34—Specifications for Heat-Treated Alloy Steel Forgings and Stampings.

(130,000 Pounds per Square Inch Tensile Strength.)

GENERAL.—1. The general specifications, 1G1, shall form according to their applicability, a part of these specifications.

MATERIAL.—2. The steel from which these forgings or stampings are made shall conform to I.A.S.B. specification 3S5.

MANUFACTURE.—3. Heat Treatment.—(a) Forgings or stampings should be annealed before heat treatment.

(b) Forgings or stampings which fail to meet the physical tests may, at the option of the purchaser, be reheat treated.

WORKMANSHIP AND FINISH.—4. (a) The forgings and stampings must be uniform in quality, free from pipes, laps, cracks, twists, and seams, and must have a workmanlike finish.

(b) A forging or stamping may be rejected at any time because of injurious defects or faults which are revealed by manufacturing operations, notwithstanding that it has previously passed inspection. Such rejected forgings or stampings shall be returned to the manufacturer at his expense. This clause shall not apply to materials fabricated after export.

PHYSICAL PROPERTIES AND TESTS.—5. (a) The heat-treated forgings or stampings shall have the following physical properties :

Tensile Test.—(b)

	Pounds per square inch	Kilograms per square milli- metre
Minimum tensile strength	130,000	91.5
Minimum yield point	115,000	80.9
Minimum elongation in 2 inches or proportional gauge length	17 per cent.	
Minimum reduction of area	50 per cent.	

Impact Test.—(c) When impact-testing machines of the pendulum type are available, tests shall be carried out if required to determine the specific impact work of rupture in foot-pounds (or kilogrammetres). Results markedly lower

than the average for this type of material will be sufficient cause for further investigation (or reheat treatment) of the material.

Brinell Hardness Test.—(d) This test shall be made after the tensile test has been met. The procedure shall be as follows:

(1) Forgings with a Prolongation for Tensile Test Specimens: A hardness test shall be made on the prolong and on the opposite end of the forging. The hardness values obtained must agree within 3 per cent. Hardness values of other forgings in the same lot must agree with the average of the two test values within 3 per cent.

(2) Forgings or stampings without Prolongations: Hardness tests shall be made on the forgings or stampings selected for the tensile test and must agree within 3 per cent. The hardness values of other forgings or stampings in the same lot must agree with the average of the values so obtained within 3 per cent.

(3) Forgings or Stampings from which a Tensile Test Specimen cannot be procured: A hardness test shall be made on the forged bar representing the forgings or stampings. The hardness values of the forgings or stampings in the lot must agree with that obtained on the bar within 3 per cent.

SELECTION OF TEST SPECIMENS.—6. *Forgings or Stampings weighing 6 lbs. (3.7 kg.) or over.*—(a) If desired each piece may be required to have a prolongation for the tensile test. Two per cent. of the forgings or stampings in each lot shall be subjected to the tensile test unless a tensile test is specified for each forging or stamping.

Forgings or Stampings weighing less than 6 lbs. (3.7 kg.) and of Suitable Section for securing a Tensile Test Specimen.—(b) Two per cent. of the forgings or stampings shall be taken for the tensile test.

(c) Forgings or stampings from which no tensile test specimen can be secured shall be represented by a bar forged from the same material and to the ruling section of the forgings or stampings in the lot. The bar must be heat treated with the lot which it represents.

(d) At least one tensile test shall be made for each lot of 50 forgings or stampings.

(e) A hardness test may be required on each forging or stamping offered. At least 25 per cent. of the pieces in each lot shall be tested for hardness.

(f) All the forgings or stampings in a lot shall be heat treated at the same time, and if possible shall be from the same heat of steel.

DIMENSIONS AND TOLERANCES.—7. The forgings and stampings shall conform to the dimensions on the drawings within the tolerances specified. Surfaces which are to be machined shall admit of finishing to the required dimensions without leaving trace of the original surface.

PACKING, SHIPPING, AND DELIVERY.—8. Small forgings or stampings shall be boxed for shipment; the gross weight of individual boxes must not exceed 220 lbs. (100 kg.). Each kind and lot of forgings or stampings shall be kept separate as inspected.

3S35—Specifications for Half-Hard Carbon Steel Bars and Billets.

GENERAL.—1. The general specifications, 1GI, shall form, according to their applicability, a part of these specifications.

MATERIAL.—2. The I.A.S.B. standard steel No. 1045 shall be used; its composition is as follows:

Number	Carbon	Man- ganese	Phos- phorus, maxi- mum	Sulphur, maxi- mum
1045	0.40-0.50	0.50-0.80	0.045	0.050

When electric or crucible furnace steel is specified in the order, the maximum allowable percentages of phosphorus and sulphur may, at the option of the purchaser, be limited to 0.03 per cent.

MANUFACTURE.—3. (a) The steel shall be manufactured,

or, at least finished by the open-hearth, electric furnace, or crucible process.

(b) A sufficient discard shall be made from each ingot to secure freedom from piping and undue segregation.

(c) The billets from which the bars are made are to be rough turned or chipped to remove all surface defects which might produce seams in the finished bar or forging. No undercutting in shipping will be allowed.

Heat Treatment.—(d) The manufacturer shall state the heat treatment recommended to give physical properties specified.

(e) If the bars are delivered in the heat-treated condition, and the physical tests show that the heat treatment has not been correct, the bars may be retreated at the option of the purchaser.

WORKMANSHIP AND FINISH.—4. (a) The bars are to be sound, commercially straight, free from pipes, laps, cracks, twists, seams, voids, and damaged ends and are to have a workmanlike finish. They are to be uniform in quality, within the stipulated margins of manufacture, capable of being turned and threaded readily and of taking a good finish.

(b) Any bar may be rejected because of injurious defects or faults in manufacture at any time, notwithstanding that it has previously passed inspection; it shall be returned to the manufacturer at the latter's expense. This clause shall not be taken to apply to materials fabricated after export.

PHYSICAL PROPERTIES AND TESTS.—5 (a) The bars shall have the following physical properties:

Tensile Test.—(b)

	Pounds per square inch	Kilograms per square milli- metre
Minimum tensile strength	95,000	65.8
Minimum yield point	70,000	49.2
Minimum elongation in 2 inches or proportional gauge length		18 per cent.
Minimum reduction of area		45 per cent.

Impact Test.—(c) In all cases in which impact testing machines of the pendulum type are available, tests may be carried out to determine the specific impact work of rupture in foot-pounds (or kilogrammetres). Results markedly lower than the average for this type of material will be sufficient cause for further investigation (or reheat treatment) of the material.

SELECTION OF TEST SPECIMENS.—6. Three bars of each size rolled from a heat shall be taken and test pieces prepared in accordance with the I.A.S.B. standards. Each test piece and the bar from which it is cut shall be stamped with an identifying number. Should any of the test pieces, after being heat treated in the manner recommended by the steel manufacturer, fail to show the prescribed physical properties, new test pieces similarly identified shall be made from the same three bars. At the option of the purchaser the steel manufacturer may prescribe a different heat treatment for the second set of test specimens, and to that end he may make such tests as he desires from the remainder of the three bars taken for the tests. Should any of the three specimens taken for the final tests fail to show the required physical properties, the bars of that heat of the size represented by the specimens shall be rejected. Where bars are purchased in the heat-treated condition, test specimens shall be cut from the heat-treated bar.

DIMENSIONS AND TOLERANCES.—7. The dimensions and tolerances shall be those given in the specification 3S11.

DELIVERY, PACKING, AND SHIPPING.—8. (a) The bars may be delivered in the annealed or in the heat-treated condition.

(b) The bars, shall in general, be grouped in bundles weighing not more than 220 lbs. (100 kg.), unless otherwise agreed between manufacturer and purchaser. The heat and the I.A.S.B. steel serial numbers shall be plainly marked on a metal tag attached to each bundle. If bars are not so grouped and bundled, each bar shall be plainly marked with the heat number and the I.A.S.B. steel serial number.

(To be continued.)

Aircraft Work on Indian Frontier.

THE useful work which is being done by aeroplanes in the difficult country along the Indian frontier, had attention again drawn to it in the *communiqué* issued by the India Office, on March 20th. In connection with punitive measures being taken against the Maris and Khotrans in Baluchistan, it was stated:—

"Our aeroplanes have on two occasions recently bombed their tribal concentrations with effect."

Two More "Overseas" Aeroplanes.

Two members of the Over-Seas Club have forwarded cheques for the purchase of aeroplanes for the Overseas Imperial Flotilla. One is the gift of Mr. H. E. Arnold, of Shanghai, and is to be named after his racing pony, "Oriole." The other will be named "Liverpool," and is the anonymous gift of a member in the north of England. The Overseas Aircraft Flotilla now numbers 113 machines, which have been bought at a total cost of £171,188.



Casualties.

Captain FRANCIS RICHARD CUBBON, M.C., now reported killed on June 9th, 1917, was born in Poona on November 29th, 1892, and was the only surviving son of Captain R. Cubbon, S. and T. Corps, I.A., and of Mrs. Cubbon, of Quetta. He was educated at Alleyne College and Dulwich College, and passed for a year from Sandhurst into the Indian Army in 1911, being attached to the Yorkshire and Lancashire Regiment in Karachi, and then appointed to the 72nd Punjabis, with whom he served on the North-West Frontier. In November, 1915, he was invalided home, and on recovering was attached to the Royal Warwicks and then to the R.F.C. He went to France as an observer on April 7th, 1917, winning his Military Cross on May 10th and a bar to it three days later. Although only two months at the front Captain Cubbon brought down more than 23 enemy machines.

Second Lieutenant CHARLES RONALD MOORE, R.F.C., who was killed on March 8th, was the eldest son of Mr. and Mrs. Charles E. Moore, late of Worcester. He was born on May 8th, 1899, and educated at Trinity College, Glenalmond. He was appointed to the R.F.C. as a cadet in April, 1917, was gazetted Second Lieutenant in the September following, and obtained his pilot's wings in January of this year. He volunteered for service overseas in February, 1918, and was appointed to a squadron of the R.F.C., in France, where he was killed two months before attaining his nineteenth year.

Major LEONARD ARTHUR TILNEY, M.C., who has been killed in an aerial fight over the enemy lines, was a lieutenant in the Household Cavalry and squadron commander, R.F.C. He was 23 years of age, the elder son of Lieutenant-Colonel R. H. Tilney, D.S.O., at present on service abroad, and of Mrs. Tilney, of Millbank House, Tattenhall, Cheshire. Educated at St. Neots, Eversley, Hants, and at Eton, he, on the outbreak of war, obtained a commission, and three months later he joined the Royal Flying Corps, obtaining his "wings" in record time. In February last year he received command of a squadron which he led with distinction, gaining the Military Cross and the Belgian Croix de Guerre, and being made an Officer of the Order of the Crown of Belgium.

Second Lieutenant REGINALD ERIC MILNE WORSLEY, R.F.C., who was killed in action on March 8th, aged 20, was the eldest son of Edward Milne Worsley, formerly of Dedham, Essex, and grandson of Reginald Worsley, solicitor, of Manchester.

Captain CHRISTOPHER F. A. LEY, Yeomanry and R.F.C., who was accidentally killed while flying on March 16th, was the second son of the late Sir Francis Ley, Bart., and was 24 years of age. He was educated at Pelham House, Folkestone, Malvern College, where he served both as house and college prefect and as sergeant in the O.T.C., and at Pembroke College, Cambridge. He took a keen interest in all games and sports, and was an excellent shot, being a member of the Malvern College VIII, and shooting at Bisley in 1911 and 1912. He also formed one of the team of four which won the Veterans' Trophy for Malvern at Bisley in 1913. He was appointed to a seat on the Board of Conservators for the Yorkshire Esk on the death of his father in 1916. Captain Ley served in Gallipoli from August to November, 1915, and there contracted typhoid fever, and in consequence spent several months in hospital. He then joined the Royal Flying Corps, and was wounded in an aerial fight in France last June. He had just been passed as fit for service, and was on the point of returning to the front when the accident happened which cut short his career.

Sub-Lieutenant HENRY JERVOIS RUAULT MAITLAND, R.N.V.R., whose name appears to-day in the official list of naval casualties, died of pneumonia following upon scarlet fever at Halifax, Nova Scotia, on March 17th. He was the younger son of the late Edward J. Maitland, and Mrs. Maitland, of Banstead Hall, Surrey, and was aged 19. Educated at Banstead Hall and Harrow, he joined the R.N.A.S. in April, 1916, but owing to an accident while flying, he was forced to

leave the Air Service, and was appointed to the Naval Control at Halifax. He went to Canada in February, 1917.

Lieutenant KEITH KNOX MUSPRATT, M.C., Dorset Regt., attached R.F.C., who was killed on March 16th in Suffolk, while flying, was the youngest son of Dr. C. D. Muspratt, of Bournemouth, and was aged 20. He was educated first at Wychwood, Bournemouth, and went in 1911 to Sherborne School, where he remained till the end of the summer term, 1916. He was a school prefect, played football for his house, the "School House," and was an active member of the O.T.C., in which he was given a commission as a cadet officer. Training at Hendon, chiefly in his holidays, he took his flying certificate before he left school, and he received his commission and joined the R.F.C. within a week of leaving Sherborne. He obtained his "wings" the following November, and was employed as an instructor before he was 19, being afterwards appointed to a testing squadron. He went to France last May, and in September was awarded the Military Cross.

Married.

On March 22nd, Lieutenant FRANK E. GILPIN, R.G.A. and R.F.C., youngest son of Major and Mrs. Gilpin, Peshawar, India, was married to RUBY MAUD, elder daughter of Mr. and Mrs. J. A. ABBOTT, Southwood, Belvedere, Kent.

On March 16th, at St. Aidan's, Coulsdon, Lieutenant CECIL DILLON McTURK, R.F.C., only son of Mr. and Mrs. McTurk, of Darlington, was married to ELEANOR, only daughter of Dr. and Mrs. VICTOR K. RYAN, of Coulsdon, Surrey.

On March 20th, in London, Lieutenant GEOFFREY NORMAN, Irish Fusiliers and R.F.C., was married to ALMA DORIS GREEN, of Sheffield.

On March 21st, at Crief Parish Church, Perthshire, NORMAN F. W. ROCKEY, R.F.C., second son of W. Rockey, M.L.A., Johannesburg, South Africa, was married to EMMA HALL, only daughter of DUNCAN and Mrs. STEWART, of Millhills, Crief, Perthshire.

The marriage took place on March 21st of Second Lieutenant DENIS E. B. K. SHIPWRIGHT, R.F.C., younger son of the late Thomas Johnson Shipwright and Mrs. Shipwright, to KATE, only daughter of the late Sir EDWARD HAIN and Lady Hain, of Treloyhan, St. Ives, Cornwall.

To be Married.

The engagement is announced between Captain JOHN HUGH OSCAR JONES, R.F.C., Ordre de la Couronne, Croix de Guerre, son of Mr. and Mrs. Charles Jones, of Hereford, and CHARLOTTE MARGARET GEORGINE BUCKNALL, elder daughter of the late John Loyd and Mrs. Bucknall, of Marlborough.

The marriage arranged between Captain A. F. LIVINGSTONE, R.F.C., and Miss JEANETTE M. J. COOPER will take place at the Church of St. John the Evangelist, Edinburgh, on Tuesday, April 2nd, at 2. All friends will be welcome at the church.

The engagement is announced of Lieutenant STANLEY J. R. SIMMONS, London Regt., attached R.F.C., of Cape Town, and GRACE, daughter of Mr. EDWARD BRANCH, Chadwell Heath, Essex.

The marriage arranged between Captain HERBERT E. STEINBERG, R.F.C., elder son of the late George Herbert Steinberg and Mrs. Steinberg, of Hampstead, and EDITH MAYNE, only daughter of Mr. and Mrs. ROBERT GOING, 51, Kensington Hall Gardens, will take place on April 10th, at 2, at Brompton Parish Church.

Items.

Lady GERTRUDE CRAWFORD, who has been appointed chief superintendent of the Women's Royal Air Force, is the daughter of the fourth Earl of Sefton and sister of the present peer. She married in 1905 Lieutenant-Colonel J. H. Crawford, Indian Army. She is a master turner, and has been engaged in practical munition work since the early days of the war, having been associated with Lady Moir in an enterprise to bring educated women into munition factories.

The British Air Service

"PER ARDUA AD ASTRA"

UNDER this heading are published each week the official announcements of appointments and promotions affecting the Royal Naval Air Service and the Royal Flying Corps (Military Wing) and Central Flying School. These notices are not duplicated. By way of instance, when an appointment to the Royal Naval Air Service is announced by the Admiralty it is published forthwith, but subsequently, when it appears in the LONDON GAZETTE, it is not repeated in this column.

Royal Flying Corps (Military Wing).

London Gazette Supplement, March 19th.

The following appointments are made:—
Flight Commanders.—From Flying Officers, and to be Temp. Capt. while so employed:—Temp. 2nd Lieut. A. D. Taylor, Gen. List; Jan. 6th. Temp. 2nd Lieut. J. W. Jones, Gen. List; Feb. 21st.

Flying Officers.—Temp. Lieut. S. G. Budgett, Shrops. L.I., and to be transfd. to R.F.C., Gen. List; Jan. 10th. Temp. Lieut. S. W. Bird, Ches. R., and to be transfd. to R.F.C., Gen. List; 2nd Lieut. A. H. A. Alban, R.A., from actg. Lieut., and to be sec'd.; Temp. Lieut. J. S. Robson, A.S.C., and to be transfd. to R.F.C., Gen. List; Jan. 11th. Temp. 2nd Lieuts. (on prob.), Gen. List, and to be confirmed in their rank:—W. L. Brintnell, H. S. Holcombe, P. V. Moseley; Dec. 8th, 1917. M. G. Carmody; Dec. 28th, 1917. J. A. Scrivener; Dec. 30th, 1917. W. M. Butler, G. W. Wilkin; Dec. 31st, 1917. C. S. Style; Jan. 8th. P. L. Roper; Jan. 9th. A. C. Edgley, A. P. Dale; Jan. 10th. H. W. Driver, K. B. Moseley; Jan. 11th. E. T. Cosslett; Jan. 12th. P. C. Westhofen; Feb. 4th. W. A. Wheeler; Feb. 7th. C. P. Allen, R. E. Taylor; Feb. 11th. J. L. Cumming, H. J. Jewell, C. G. Kitchingman, P. W. J. Harris, H. Wesley-Segui; Feb. 12th.

Flying Officers (Observers).—Lieut. J. Malcolm, Canadian Forestry Corps; Aug. 11th, 1917, seniority from June 27th, 1917. 2nd Lieut. E. T. Taylor, R.F.A. (T.F.), seniority from November 5th, 1917, and to be sec'd.; Feb. 15th. Seniority from Nov. 21st, 1917:—Lieut. T. I. Findley, Canadian F.A.; Lieut. W. H. Dixon, Manitoba R., Canadian Exped. Force; 2nd Lieut. J. S. C. Robinson, Yorks R. (T.F.), and to be sec'd.; Temp. 2nd Lieut. (on prob.) A. O. Matt, Gen. List, and to be confirmed in his rank.

Equipment Officers, 3rd Class.—Temp. Lieut. M. A. Doyle, R.E., from a Flying Officer; May 12th, 1917. Capt. G. E. Allen, Manch. R. (T.F.), and to be sec'd.; Sept. 1st, 1917. Lieut. J. N. Mearns, S.R.; Nov. 1st, 1917, seniority from Dec. 20th, 1915, without pay prior to Nov. 1st, 1917. Maj. W. T. W. Scott, Rif. Brig., (T.F.), from Lab. Corps; 2nd Lieut. G. A. Gore, L'pool R. (T.F.), and to be sec'd.; Feb. 14th. 2nd Lieut. F. P. L. Mannock, R. Welsh Fus. (T.F.), and to be sec'd.; Feb. 16th. Temp. 2nd Lieuts. (on prob.), Gen. List, and to be confirmed in their rank:—S. W. Bennett; Dec. 3rd, 1917. J. H. Slingsby; Dec. 29th, 1917; J. A. Atkinson; Jan. 1st.

General List.—Temp. Lieut. W. W. Gibson, Gen. List, to be Temp. Capt. (without pay or allowances of that rank) while specially employed: March 4th. The name of Temp. 2nd Lieut. (on prob.) Henry Benjamin Bullis as now described and not Harry Bull as in the Gazette of Jan. 26th. Cadets to be Temp. 2nd Lieuts. (on prob.):—H. R. Acteson, P. Addison, W. B. Aldred, W. A. Allen, T. Bateman, A. Bell, W. A. Bennett, J. E. Bird, H. Blatcher, E. S. Brooks, R. L. Brown, S. A. Burree, W. A. N. Butler, S. E. Calvert, G. Chellingsworth, R. W. Corner, H. Cox, F. E. Goddard, D. H. Godden, M. W. Gourlay, E. A. Grant, J. D. Headshaw, N. Hickson, E. Higgs, F. L. Howard, L. H. Howard, J. T. Howdle, E. Hoy, H. P. Johnston, J. Ker, T. A. Kennedy, C. H. P. Killick, H. E. Larsen, W. T. Laurie, J. H. Laycock, P. H. Leigh, H. Lewis, F. G. Lockett, H. Macmillan, D. Macartney-Filgate, W. A. Malcolm, D. McKellar, A. Midgley, H. Monkman, E. S. Morrison, K. G. Nairn, R. W. Norris, G. E. Oates, T. Pearson, P. V. Penhallvick, V. D. Phillips, L. M. Pickwick, L. Proudfoot, R. T. Raw, T. F. Reading, W. Redmond, T. Richardson, E. J. Roberts, W. S. Roberts, G. P. Robinson, C. J. Rogers, W. K. Rose, L. O. B. Russell, J. D. Russell, C. J. C. Sheridan, F. H. Simon, R. A. Smith, C. R. Southwell, G. D. Stewart, R. C. Stiven, S. H. H. Swanton, N. A. Talbot, H. Taylor, W. C. C. Taylor, S. A. Thomson, S. W. Tatham, J. Todd, H. Walmsley, R. A. Whyte; March 9th. W. N. Ashburner, R. J. Barnes, W. Berwick, J. O. Boole, S. H. Batty, A. L. Bloom, D. E. Cameron, H. Chambers, J. C. Crunden, J. C. Crawford, J. L. Colbourne, A. O. Coghill, C. H. Dickinson, H. Day, J. C. Dunbar, A. Dayton, H. Ellison, G. S. Fenwick, D. Fraser, F. G. Gage, A. R. C. Greene, E. I. Godfrey, A. R. Hedgecock, G. R. Hodgkinson, A. E. Holmes, W. H. Hadfield, M. J. Hemmer, K. T. Irwin, R. A. P. Johanson, S. N. Jacobson, C. S. Keeling, R. J. Kirby, F. B. Love, G. R. Mason, R. B. Murray, E. O. W. Matthews, H. M. Matthews, A. Mackie, H. E. Miles, C. G. Nettleton, H. R. Owen, C. Oakley, A. Piercy, J. T. Potts, R. C. Pellow, C. H. Place, F. W. Purnell, W. F. H. Parish, V. H. Richardson, A. T. Rose, R. H. Ramsay, C. E. Ray, J. L. Rogers, A. C. Scott, A. Shepherd, E. L. Stacey, G. C. D. Snapp, F. Stanley, F. R. Stewart, H. F. Shrimpton, E. A. Siegrist, R. A. Shaw, F. Stringer, E. H. Smy, H. W. Turner, P. F. R. Topley, L. E. Walmsley, E. N. Ward, S. Whitehouse, S. G. Williams, L. H. Walker, B. G. J. Wood, L. V. West, S. W. White, J. D. Young, W. B. Young, A. W. S. Youngson; March 10th.

The Christian names of 2nd Lieut. (now Temp. Capt.) Leicester Edward Taylor are as now described, and not as stated in Gazette of Sept. 13th, 1915, and subsequent notifications.

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Special Appointments.—(Graded for purposes of pay as a Brig.-Maj. while employed as 2nd in Comd. of an R.F.C. Officers' Technical Training Wing.)—Capt. (Actg. Maj.) W. Seaton, M.C., Notts and Derby R. (T.F.) (from Nov. 1st, 1917, to Jan. 25th).

The following appointments are made:—

Wing Commander.—Capt. (Temp. Maj.) A. A. B. Thomson, M.C., R. War. R., from a Sqdn. Comdr., and to be Temp. Lieut.-Col. while so employed; Feb. 8th.

Squadron Commanders.—From Flight Comdrs., and to be Temp. Maj. while so employed:—2nd Lieut. (Temp. Capt.) A. D. Bell-Irving, M.C., Gord. Highrs., S.R.; Jan. 31st, seniority Oct. 1st, 1917. Capt. C. G. Burge, York. and Lanc. R.; Feb. 8th. Temp. Capt. P. J. V. Lavarack, M.C., Gen. List; Feb. 23rd.

Special Appointments.—(Graded as Sqdn. Comdrs.)—Flight Comdrs., and to be Temp. Maj. while so employed:—Lieut. (Temp. Capt.) E. J. L. W. Gilchrist, M.C., Lrs., S.R.; 2nd Lieut. (Temp. Capt.) C. E. M. Pickthorn, M.C., A.S.C., S.R.; Temp. Capt. F. P. Holliday, D.S.O., M.C., Gen. List; Jan. 8th.

Flight Commanders.—From Flying Officers, and to be Temp. Capt. while so employed:—Temp. Lieut. G. E. Gibbs, Gen. List; Feb. 20th. Temp. 2nd Lieut. G. D. Jooste, Gen. List; March 4th.

Flying Officers.—Temp. Lieut. W. C. L. O'Carrell, att'd. R. Ir. R., and to be transfd. to R.F.C., Gen. List; Jan. 3rd. Lieut. J. E. Carpenter, Dorset R., S.R., from M.G. Corps; Jan. 4th. Temp. 2nd Lieut. (Actg. Capt.) W. Elliott, A.S.C., to relinquish his actg. rank, and to be transfd. to R.F.C. Gen. List; Jan. 5th. Lieut. R. E. Brooks, Quebec R., Canadian Exped. Force; Lieut. J. Irwin, Saskatchewan R., Canadian Exped. Force; Feb. 17th. Temp. Lieut. E. A. Windridge, Gen. List, from a Flying Officer (Obs.), seniority Dec. 28th, 1916. Lieut. G. R. P. Wall, Linc. R., S.R., and to be sec'd.; Feb. 18th. 2nd Lieut. H. S. Baldwin, Worc. R., S.R., and to be sec'd.; March 4th. Temp. 2nd Lieuts. (on prob.), Gen. List, and to be confirmed in their rank:—A. T. Iaccaci, P. T. Iaccaci; Nov. 4th, 1917. J. W. H. Scale, W. H. Oliver; Nov.

6th, 1917. H. G. Nelson; Dec. 15th, 1917. D. Davidson, E. C. White; Jan. 3rd. H. Macpherson, W. C. Greene; Jan. 4th. L. W. Prescott, P. D. S. Milnes, L. Randles; Jan. 5th. W. J. Garrity; Jan. 12th.—Le G. Cunningham; Feb. 11th. G. Watson; Feb. 13th. H. A. Sparks, G. B. Holmes; Feb. 16th. T. W. Franks; Feb. 17th. F. H. Johnson, H. H. Hall, C. A. Jordan, F. J. Jones, Feb. 18th. J. H. Smith; Feb. 19th. The date of the appointment of Temp. 2nd Lieut. R. Parkhouse, att'd. S. Staff. R., is Jan. 15th, and not as in the Gazette of Feb. 7th.

Flying Officers (Observers).—Temp. 2nd Lieut. E. R. Lickfold, Br. W. Ind. R. (2nd Lieut. Trinidad Local Forces); Oct. 1st, 1917, seniority from June 9th, 1917. 2nd Lieut. B. S. B. Baylis, York. and Lancs. R. (T.F.), and to be sec'd. Feb. 19th, seniority from Nov. 12th, 1917. Lieut. J. A. Moir, R.H.A. (T.F.), seniority from Nov. 20th, 1917, and to be sec'd.; Feb. 19th. Seniority from Nov. 21st, 1917:—Lieut. A. C. Gilmour, Manitoba R., Canadian Exped. Force; 2nd Lieut. F. L. Pascoe, Lond. R. (T.F.); Lieut. G. Dania, R.F.A., S.R., seniority from Nov. 28th, 1917. Seniority from Dec. 11th, 1917:—2nd Lieut. P. H. Clarke, M.C., R.G.A., S.R.; Feb. 18th. Temp. 2nd Lieut. F. W. Rushon, M.C., Essex R., and to be transfd. to R.F.C. Gen. List; Feb. 16th. Temp. 2nd Lieuts. (on prob.), Gen. List, and to be confirmed in their rank:—F. Nightingale; Feb. 17th, seniority from Nov. 12th, 1917. H. Soulsby; Feb. 18th, seniority from Nov. 21st, 1917.

Balloon Company Commanders.—(Graded as Flight Comdrs.), from Balloon Comdrs. (graded as Balloon Officers), and to be Temp. Capt. while so employed: Lieut. P. S. Kershaw, S.R.; Jan. 14th. Lieut. J. P. Nickalls, R.A.; Feb. 6th.

Balloon Commanders.—(Graded as Balloon Officers). From Balloon Officers: Temp. Lieut. H. W. Tait, Gen. List; Jan. 16th. Lieut. A. B. Harper, R.F.A. (T.F.); Feb. 6th.

Equipment Officers, 3rd Class.—Temp. 2nd Lieut. A. Barnes, Gen. List. Temp. 2nd Lieuts. (on prob.), Gen. List, and to be confirmed in their rank:—C. D. Neale, E. C. Stanners, H. J. Wadkin, B. P. K. Walsh; Feb. 16th.

Experimental Officer, 3rd Class.—(Graded as an Equipment Officer, 3rd Class).—Temp. Capt. S. Smith, Gen. List; Jan. 25th.

Schools of Instruction.—Wireless School.

Assistant Commandant.—(Graded as a Park Comdr.)—Lieut. (Temp. Capt.) E. Powell, S.R., an Equipment Officer, 1st Class, and to be Temp. Maj. while so employed; Jan. 1st. (Substituted for the notification in the Gazette of Feb. 11th.)

General List.—Temp. 2nd Lieuts. to be Temp. Lieuts.:—C. M. Maud, C. G. Vandyk, E. J. Girdler, J. B. Glass, A. A. Miles; July 1st, 1917. C. E. Woodhams; July 8th, 1917. E. T. Pruett; Sept. 19th, 1917. R. A. Cotman; Oct. 30th, 1917. L. W. B. Parsons; Nov. 15th, 1917. D. Coates; Dec. 3rd, 1917. R. J. Warner; Dec. 17th, 1917. V. A. Cooper; Dec. 27th, 1917. A. Lindley, R. Law, C. H. Smith, A. C. Wyness, G. Eastwood, L. W. Osman, W. G. Holbrow, J. H. Goteh; Jan. 7th. A. J. Gogarty; Jan. 8th. C. S. Emery; Jan. 17th. H. C. Short; Jan. 22nd. W. T. Jourdan; Feb. 1st. D. P. Walter; Feb. 5th. C. R. V. Cook, J. C. Cantrill; Feb. 28th. Temp. 2nd Lieut. P. A. O'Brien, relinquishes his commission on account of ill-health contracted on active service and is granted the hon. rank of 2nd Lieut.; March 21st. Temp. 2nd Lieuts. resign their commissions:—W. Pople, R. C. Ryan; March 21st. To be Temp. 2nd Lieuts.:—Pte. F. E. Thomson, from Essex R. (T.F.); Dec. 12th, 1917. Flight-Sgt. G. W. Halstead, from R.F.C.; March 1st. Cadet C. C. Hoey to be Temp. 2nd Lieut. (on prob.); Feb. 21st.

Supplementary to Regular Corps.—Lieut. G. Iredell to be employed with Labour Corps; Feb. 4th. 2nd Lieut. D. Deakin is placed on the retired list on account of ill health; March 21st.

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Supplementary to Regular Corps.—2nd Lieut. E. F. Nash to be Lieut.; Sept. 16th, 1916. 2nd Lieut. (on prob.) E. O. Lord is confirmed in his rank.

General List (R.F.C.).—Cadet P. C. Westhoven to be Temp. 2nd Lieut.; Sept. 13th, 1917. (Substituted for Gazette notification Oct. 9th, 1917, page 10395, describing surname as Westophen).

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The following appointments are made:—

Staff Officer, 2nd Class.—(Graded as a Brig. Maj.)—Temp. Lieut. (Temp. Maj.) A. H. Parker, M.C., Gen. List, from a Balloon Co. Comdr. (graded as a Sqdn. Comdr.), to relinquish the temp. rank of Maj. and to revert to Temp. Capt. while so employed; Feb. 1st.

Squadron Commander.—Capt. (Temp. Lieut.-Col.) R. Loraine, D.S.O., M.C., S.R., to revert from a Wing Comdr., to relinquish his temp. rank of Lieut.-Col. and to be Temp. Maj. while so employed; March 3rd, seniority April 24th, 1916.

Flight Commanders.—From Flying Officers.—And to be Temp. Capt. while so employed:—Lieut. G. S. M. Insall, V.C., S.R.; Jan. 11th, seniority Aug. 10th, 1917. Temp. 2nd Lieut. P. W. S. Bulman, M.C., Gen. List; Feb. 24th. Capt. G. C. Walker, A.S.C. (T.F.); Feb. 25th. And to be Temp. Capt. while so employed:—Temp. Lieut. F. C. B. Douglas, Gen. List; Lieut. P. D. Baker, R.F.A. (T.F.); 2nd Lieut. (Temp. Lieut.) G. J. Scaramanga, N. Staff. R., S.R.; Lieut. F. M. Carter, S.R.; Feb. 25th. Lieut. A. M. Maclean, Yeo. (T.F.); Feb. 28th. Lieut. (Temp. Capt.) H. A. Fordham, North's Fus., from a Staff Officer, 3rd Class (graded as a G.S.O., 3rd Grade, at the War Office), and to retain his temp. rank while so employed; March 3rd, seniority June 14th, 1917.

Flying Officers.—Lieut. W. E. Marshall, A.S.C. (T.F.); Feb. 12th. From Flying Officers (Observers).—Lieut. J. H. Reid, Quebec R., Canadian Exped. Force, with seniority April 6th, 1917. Lieut. G. Milner, Quebec R., Canadian Exped. Force, seniority April 21st, 1917; Feb. 15th. Temp. 2nd Lieut. W. Halford, Garr. Bn., Suff. R., and to be transfd. to R.F.C., Gen. List; Feb. 16th. Lieut. W. Bruce, Saskatchewan R., Canadian Exped. Force; Lieut. A. T. S. L. de Lacroix, Yeo. (T.F.), from a Flying Officer (Obs.), seniority March 5th, 1917. 2nd Lieut. H. V. Sanderson, R.A., and to be sec'd.; Feb. 17th. Temp. Capt. R. C. G. Somervell, att'd. K.R. Rif. C., and to be transfd. to R.F.C., Gen. List; Feb. 19th. Temp. 2nd Lieuts. (on prob.), Gen. List, and to be confirmed in their rank:—C. S. Stonehouse; Sept. 22nd, 1917. H. C. Little; Nov. 4th, 1917. S. McB. Black; Jan. 3rd. J. R. Tansey; Jan. 4th. R. E. Dodds; Jan. 5th. E. L. Johnson; Jan. 30th. G. S. Swain; Jan. 31st. T. R. Hostetter; Feb. 6th. B. Holding, S. H. Evans, R. B. Hill; Feb. 12th. J. E. E. Bushell, J. Headlam, C. McPhail, T. G. Blakelev, D. L. Holmes; Feb. 13th. E. W. P. Lamb, G. W. Wareing; Feb. 14th. T. M. Jones, C. C. Summers; Feb. 15th. C. A. Mason, J. R. Webb, R. J. G. Davis, H. Beresford, A. J. G. King, R. R. F. Gill, W. J. Lindop, C. E. Barraclough, S. G. Ford; Feb. 16th. W. Atkinson, W. F. Ogilvy, E. R. Trendell, J. Stanley, C. H. P. Hughes, T. O. Henderson; Feb. 17th. J. A. Pouchot, D. V. Hodgson, A. Curley, H. F. D.

Delpes, F. Smethurst, F. S. Passmore, C. C. Macdonald, G. M. Duncan, Feb. 18th. E. W. Shaw; Feb. 19th. Lieut. (Temp. Capt.) S. E. Faber, S.R., reverts from a Flight Comdr., and relinquishes his temp. rank; Feb. 18th, seniority May 10th, 1916.

Flying Officers (Observers).—Temp. Lieut. A. W. Mackay, S. Wales Bord., seniority Aug. 1st, 1917, and to be transd. to R.F.C., Gen. List; Capt. N. W. Taylor, Canadian A.S.C., seniority Dec. 5th, 1917; Feb. 20th. Lieut. H. W. Higham, Notts, and Derby R. (T.F.), and to be secd.; Oct. 20th, 1917, seniority Sept. 10th, 1917. Lieut. C. M. Sinclair, A.S.C., and to be secd.; Feb. 20th, seniority Oct. 23rd, 1917. Seniority Dec. 5th, 1917:—Temp. Lieut. J. N. Dugdale, Durh. L.I.; Feb. 20th, and to be transd. to R.F.C. Gen. List; 2nd Lieut. E. J. Brabrook, Lond. R. (T.F.); Feb. 21st, and to be secd.; Lieut. W. T. Saidler, R.G.A. (T.F.); Feb. 21st, seniority Dec. 6th, 1917. Temp. Lieut. W. H. Gibson, W. York. R., and to be transd. to R.F.C. Gen. List; Feb. 20th, seniority Dec. 11th, 1917. 2nd Lieut. G. W. Gotch, R.G.A., S.R., seniority Dec. 13th, 1917; 2nd Lieut. J. J. Scaramanga, S.R., from a Flying Officer, seniority Dec. 29th, 1917; Feb. 21st. 2nd Lieut. S. W. Swaine, R.A., seniority Oct. 18th, 1917, and to be secd.; Temp. 2nd Lieut. T. A. W. Foy, R.E., seniority Nov. 21st, 1917; Feb. 25th. Lieut. C. H. S. Ackers, K.R.R.C., and to be secd.; Feb. 23rd, seniority Dec. 5th, 1917. Feb. 25th, seniority Dec. 30th, 1917:—Lieut. H. S. Redpath, Arg. and Suth'd Highrs (T.F.), and to be secd.; Temp. 2nd Lieut. E. I. Wells, Rif. Brig., and to be transd. to R.F.C. Gen. List; 2nd Lieut. J. T. Peacock, D. of Corn. L.I., S.R., and to be secd.; Feb. 24th, seniority January 3rd. Temp. Capt. E. Beadon, M.C., A.S.C., seniority Dec. 31st, 1917, and to be transd. to R.F.C., Gen. List; Temp. 2nd Lieut. H. Senior, E. York. R., seniority Jan. 4th, and to be transd. to R.F.C. Gen. List; Feb. 21st. Temp. 2nd Lieuts. (on prob.), Gen. List, and to be confirmed in their rank:—P. H. Redmayne; Feb. 25th, seniority Oct. 19th, 1917. R. D. Warren, seniority Oct. 25th, 1917. F. Sidebotham, seniority Dec. 13th, 1917; Feb. 21st. C. S. White, seniority Nov. 4th, 1917. C. A. Burpee, seniority Dec. 5th, 1917. D. H. Prosser, seniority Dec. 12th, 1917; Feb. 20th. R. F. Newton; Feb. 24th, seniority Nov. 21st, 1917. H. B. Davies; Feb. 25th, seniority Dec. 30th, 1917.

Balloon Officers.—Lieut. (Temp. Capt.) P. H. Flood-Page, A.S.C., (T.F.), and to be secd.; Jan. 1st. Temp. 2nd Lieut. L. W. Baker, Gen. List, sen.; Jan. 21st, 1917, without pay prior to Nov. 29th, 1917.

Equipment Officers, 1st Class.—From the 2nd Cl. and to be Temp. Capts., while so employed:—Lieut. E. W. Stubbs, L'pool R. (T.F.); Dec. 11th, 1917. Lieut. H. G. Gibbs, S.R.; Feb. 8th. Lieut. S. S. Dixon, S.R.; Feb. 20th. Temp. Lieut. H. McKenna, Gen. List; March 1st. 3rd Cl.—Temp. Lieut. A. Ellison, Gen. List, from a Flying Officer; Aug. 30th, 1917. Temp. 2nd Lieut. G. A. Edwards, Gen. List; Temp. 2nd Lieut. V. S. Lord, Gen. List; Dec. 3rd, 1917. 2nd Lieut. A. A. Punt, Lond. R. (T.F.), and to be secd.; Feb. 7th. Temp. 2nd Lieuts. (on prob.), Gen. List, and to be confirmed in their rank:—W. H. Spann; Jan. 6th. L. G. Mace; Feb. 14th. W. R. Day; Feb. 16th. A. O'Sullivan; Feb. 19th.

General List.—Temp. Lieut. G. A. Wilding relinquishes his commission on account of ill-health contracted on active service, and is granted the hon. rank of Lieut.; March 23rd. Temp. 2nd Lieuts. relinquish their commissions on account of ill-health, and are granted the hon. rank of 2nd Lieut.:—C. P. Leckie, The Hon. R. Westenra; March 23rd. P. J. Reunert, late Lieut., S. Afr. Inf., to be Temp. 2nd Lieut. (on prob.); June 20th, 1917 (substituted for the notification in the *Gazette* of Aug. 14th, 1917). To be Temp. 2nd Lieuts. (on prob.):—E. R. Beckwith, J. L. Cleland, J. E. McCrea, G. McLaughlin, W. H. Southwood, F. L. Sutcliffe, W. S. Vipond, A. B. Wearing; Jan. 28th. 1st Cl. Air-Mech. J. McRobert, from R.F.C.; Feb. 4th. H. N. Bulley; March 1st. R. S. MacCorimac, Lce.-Cpl. W. Teer, from R.E. (T.F.); March 11th.

Memorandum.—Sgt.-Major C. Littlejohn—from R.F.C., to be 2nd Lieut., whilst serving with R.F.C.; Feb. 19th.

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The following appointments are made:—
Flying Officers.—Temp. Lieut. F. C. G. Broome, A.S.C., and to be transd. to R.F.C., Gen. List; Dec. 27th, 1917. Temp. 2nd Lieut. P. H. Oleiff, Gen. List; Jan. 1st. Temp. Capt. L. D. B. Monier-Williams, A.S.C., and to be transd. to R.F.C., Gen. List; Jan. 16th. Temp. Capt. W. Petre, A.S.C., to be transd. to R.F.C., Gen. List; Jan. 18th. Temp. Lieut. J. Evans, M.C., Gen. List, from a Flying Officer (Ob.); Jan. 23rd, seniority from Jan. 11th, 1917. 2nd Lieut. A. V. P. Davey, R.F.A., S.R.; Jan. 28th. 2nd Lieut. J. Balfour, K.O.S.B. (T.F.), and to be secd.; Jan. 31st. Lieut. R. McInerney, New Brun. R., Canadian Exped. Force; Feb. 3rd. Temp. 2nd Lieut. H. V. Jones, Gen. List, from a Flying Officer (Ob.); Feb. 8th. seniority March 19th, 1917. Temp. Lieut. M. H. Harland, Gen. List, from a Flying Officer (Observer); Feb. 10th, seniority from Jan. 9th, 1917. Lieut. D. A. Macdonald, Canadian Forestry

Corps; Feb. 12th. Lieut. E. P. Mackay, R.G.A. (T.F.), and to be secd.; Feb. 13th. Lieut. J. M. MacKay, Quebec R., Canadian Exped. Force; Feb. 15th. Lieut. A. Belle, Leic. R., and to be secd.; Feb. 16th. Lieut. C. A. Howse, Br. Columbia R., Canadian Exped. Force; Lieut. J. E. Wood, Br. Columbia R., Canadian Exped. Force; Temp. 2nd Lieut. S. C. Stevens, Ches. R., and to be transd. to R.F.C., Gen. List; Feb. 17th. Lieut. K. B. Forster, Manitoba R., Canadian Exped. Force; Lieut. W. H. Goodale, Saskatchewan R., Canadian Exped. Force; Feb. 18th. Temp. 2nd Lieuts. (on prob.), Gen. List, and to be confirmed in their rank:—J. D. Thomas; Nov. 4th, 1917. C. W. Peckham; Dec. 5th, 1917. H. J. Fitzgibbon; Dec. 13th, 1917. H. M. Brown; Dec. 28th, 1917. F. W. Gillet; Dec. 29th, 1917. C. McE. Carpenter; Jan. 1st. B. S. Hillis, L. Miller; Jan. 5th. E. J. Lussier, L. H. McIntyre, L. S. Morange; Jan. 7th. L. H. Ray; Jan. 13th. D. Chisholm, C. R. Mason, R. O. Schallaire; Jan. 17th. J. W. Thomson; Jan. 22nd. C. C. Lloyd; Jan. 27th. P. F. Townley; Feb. 3rd. T. W. Robson, R. C. Richards, T. M. G. Lamb, J. Lowe; Feb. 4th. A. F. Dawes; Feb. 5th. A. Wild; Feb. 6th. J. G. Sutton, P. L. Evans, W. G. D. H. Nicol, G. A. Elmslie, W. R. Elson, A. D. Robinson; Feb. 8th. L. A. Greenwood, J. J. C. Hamman; Feb. 9th. A. Dent, C. W. Snook, J. H. S. Broughall; Feb. 12th. N. Haigh, L. A. Wykes, C. W. Rivers; Feb. 13th. H. J. Scott; Feb. 14th. G. E. French, L. B. Gately, E. S. Flatman, W. W. Smyth; Feb. 15th. E. D. Asbury, J. Reid, W. C. Stewart, W. J. E. Johnston, F. E. Ball; Feb. 16th. A. W. Tutt, W. J. N. Morrisby, G. L. Webster, J. Weight; Feb. 18th. Y. E. S. Kirkpatrick; Feb. 19th. J. R. Holden; Feb. 20th. O. G. Brittorous; Feb. 21st.

Balloon Officers.—Capt. W. B. B. Bishop, Can. A.S.C.; Lieut. A. R. Mann, R.F.A. S.R.; Feb. 22nd.

Adjutant.—Major R. Money, R. Lanc. R.; Feb. 8th.

Equipment Officers, 1st Class.—Lieut. R. G. Cookson, S.R., from a Staff Lieut. at the War Office, and to be Temp. Capt. while so employed; Feb. 27th. 2nd Cl.—Temp. 2nd Lieut. H. G. Gregory, Gen. List, from the 3rd Cl., and to be Temp. Lieut. while so employed; Dec. 3rd, 1917. 3rd Cl.—2nd Lieut. C. E. Cullen; Oct. 9th, 1917. Temp. Lieut. S. Herbert, Linc. R., and to be transd. to R.F.C., Gen. List; Jan. 1st. Temp. Lieut. J. Butcher, A. Cyclist Corps, and to be transd. to R.F.C., Gen. List; Jan. 24th. Temp. 2nd Lieut. W. A. Gaze, Labour Corps, and to be transd. to R.F.C., Gen. List; Jan. 26th. Lieut. D. C. N. Cook, R.F.A. (T.F.), from R.E. Sig. Ser.; Feb. 1st. Qrmt. and Hon. Lieut. G. Stimmers, E. Kent R. (T.F.), Lieut. L. Butterfield, Yeo. (T.F.), and to be secd.; 2nd Lieut. H. D. Patterson, Hamps. R. (T.F.); Feb. 8th. Temp. 2nd Lieuts. (on prob.), Gen. List, and to be confirmed in their rank:—J. L. Hill; Dec. 3rd, 1917. C. C. V. Roebuck; Dec. 24th, 1917. R. H. B. Tomlinson; Jan. 1st. R. S. MacD. Salt; Jan. 7th. H. Freeman; Jan. 21st. C. F. Sweetman, J. L. H. Thomson, M. H. B. Heigham, C. R. Holmes, E. G. P. Hopkins, E. B. Kent, C. H. Mackinnon, J. C. Mungovan, S. C. Rose, W. M. Russell; Jan. 28th. B. A. Gunner, A. G. Clayton; Feb. 1st. F. H. Sandy, A. E. Mills; Feb. 17th. W. A. Fowler; Feb. 18th. E. Haghe, C. Lill; Feb. 19th. S. Tew; Feb. 24th.

Schools of Instruction.—*School of Military Aeronautics.*

Instructors (graded as Equipment Officers, 1st Class).—From Asst. Instrs. (graded as Equipment Officers, 2nd Cl.), and to be Temp. Capts. while so empd.; 2nd Lieut. (Temp. Lieut.) A. Wombwell, Linc. R.; Jan. 1st. Lieut. P. C. Routley, Welsh R. (T.F.); Jan. 15th.

Assistant Instructor (graded as an Equipment Officer, 2nd Class).—Temp. 2nd Lieut. (on prob.) A. J. Packham, Gen. List, to be confirmed in his rank and to be Temp. Lieut. while so employed; Nov. 8th, 1917.

School of Technical Training.

Park Commander.—Capt. R. H. C. Routley, R. Fus., from a special appt. (graded as a Staff Capt. while comdg. a Sqdn., R.F.C., Officer Cdt. Wing), and to be Temp. Major while so employed; Nov. 22nd, 1917.

General List.—Temp. Lieut. F. Facer relinquishes his commission on account of ill-health contracted on active service, and is granted the hon. rank of Lieut.; March 24th. Temp. 2nd Lieut. W. Birch to be Temp. Lieut.; July 1st, 1917. Temp. 2nd Lieuts. relinquish their commissions on account of ill-health contracted on active service, and are granted the hon. rank of 2nd Lieut.:—E. A. James, G. H. Wood; March 24th. Temp. 2nd Lieut. H. W. E. McDonald relinquishes his commission on account of ill-health; March 24th. The surname of Temp. 2nd Lieut. (on prob.) W. W. Smyth is as now described, and not as in the *Gazette* of Nov. 23rd, 1917. Sgt. H. W. Savage, from Yeo. (T.F.), to be Temp. 2nd Lieut.; Oct. 27th, 1917. Sgt. P. H. Oleiff, from R.F.C., to be Temp. 2nd Lieut. for duty with R.F.C.; Jan. 1st. To be Temp. 2nd Lieuts. (on prob.):—P. Gent; March 1st. G. E. Suter; March 11th.

Supplementary to Regular Corps.—2nd Lieut. (on prob.) C. J. Thomsen is confirmed in his rank.



Wages of Skilled Woodworkers.

THE following is the recent decision given by the Committee on Production on the case for skilled aircraft woodworkers, which has been referred to them by the Ministry of Labour:—

"Skilled woodworkers employed in establishments engaged in manufacture or repair of aeroplanes or seaplanes, directly on such manufacture or repair, being handicraftsmen or general woodcutting machinists who have been working four years on woodcutting machines, are to receive, in the case of plain time-workers, a bonus of 12½ per cent. on earnings, and, in the case of piece-workers and men working at augmented time rates fixed in lieu of piece rates or by reference to results or to output of work, a bonus of 7½ per cent. on earnings (excluding travelling time, outworking, and similar allowances) from January 1st, 1918. Under the Skilled Aircraft Woodworkers' Wages Order, 1918, skilled aircraft woodworkers became entitled to the minimum or standard district rate of either cabinetmakers or coachmakers, or house carpenters and joiners, whichever may have been the highest in force in each district on November 1st, 1917, provided that in no case should the minimum rate in any district be less than 1s. an hour. Skilled woodworkers within the meaning of the Order employed in aircraft establishments (which expression includes any manufacturing establishment engaged wholly on the manufacture or repair of aeroplanes or seaplanes or of components or parts thereof, and any workshops belonging to a composite establishment in which such work is exclusively carried on) are to receive an advance of 5s. a week from

first pay in December, 1917. Having regard to the diversity which exists in respect of wages in establishments other than those indicated above, the Committee on Production make no general order as to an advance of wages to men employed on aircraft work alongside other work in such other establishments. Any necessary adjustments required in these establishments are to be discussed by the parties concerned."

Five to One.

The Air Ministry, on March 21st, issued the following comparison of the number of bombs dropped during February by the enemy in the area occupied by British troops in France, and the number dropped by the R.N.A.S., R.F.C., and Australian Flying Corps in enemy areas:—

	British.		Enemy.	
By day	5,290	28
By night	3,553	1,768
			8,843	1,796

French Champion's Record.

SUB-LIEUT. FONCK has now completed over 1,000 hours' flight over the enemy's lines without having once been struck by a bullet, or ever having had a single mishap. He holds the Croix de Guerre with 18 Palms.

A French Pilot-Prince Killed.

THE *Journal* announces the death of Flight-Lieut. de Rochechouart de Mortemart, Prince de Tonnay-Charente, who has been mentioned in despatches on many occasions for conspicuous bravery. He was seen to fall into the German lines in a wood on the Verdun front.

AIRCRAFT WORK AT THE FRONT.

OFFICIAL INFORMATION.

British.

General Headquarters, March 19th.

"On the 18th inst. the atmosphere was again clear and favoured the co-operation of the aeroplanes and artillery. Several long-distance reconnaissances were successfully completed, and many photographs were taken by us. Nine tons of bombs were dropped on the enemy's rest billets and ammunition dumps and also on Busigny railway station and two hostile aerodromes. One of these latter is occupied by large hostile bombing machines. Fighting in the air was exceedingly intense, encounters taking place between large formations of our own and the enemy's machines. Nineteen German aeroplanes were brought down and nine driven down out of control. Twelve of our machines are missing. Our bombing machines also attacked military objectives at Mannheim, on the Rhine, dropping over a ton of bombs with excellent results. Eight direct hits were obtained on the Badische soda factory, causing an abnormally large column of black and white smoke to ascend. Two bursts were also seen on the docks, and one on another large factory. Our aeroplanes were attacked by two formations of hostile machines. As the result of the fighting two German aeroplanes were driven down out of control over Mannheim and the remainder of the enemy's machines were driven off. All our machines returned.

"During the night, a further 600 bombs were dropped by us on two aerodromes used by the enemy's night-flying machines, and on ammunition depôts and billets. All our machines returned."

Admiralty, March 20th.

"On March 19th a British seaplane patrol flying in the Heligoland Bight encountered two enemy seaplanes 10 miles to the north-eastward of Borkum. The enemy was engaged and one of his machines driven down in flames. Our machines returned safely."

War Office, March 20th.

"Our aeroplanes have bombed Angista and Porna stations. Near the latter place a train was attacked by machine-gun fire from a low altitude. The driver was seen to jump off, and the train was derailed and subsequently bombed. Another aeroplane directed machine-gun fire from a height of 300 ft. against a Bulgarian gun in Seres.

"A hostile machine was shot down and fell into Lake Doiran."

Admiralty, March 21st.

"Ostend was bombarded this afternoon by British monitors with successful results. Prior to the bombardment four enemy aircraft were destroyed by a naval air squadron. Enemy aircraft attacked British machines while spotting for bombardment, with the result that another enemy machine was destroyed. "British seaplanes engaged in reconnaissance in the Heligoland Bight attacked enemy minesweepers with machine-gun fire. No casualties on the British side. All machines returned safely."

General Headquarters, March 21st.

"On the 20th inst. rain and clouds almost entirely prevented flying. After dark, when the weather cleared, our night-flying squadrons dropped 300 bombs on a hostile aerodrome, south-west of Tournai, used by the enemy's night-flying machines, and also on a large ammunition depôt north-east of St. Quentin. All our machines returned."

War Office, March 21st.

"Palestine Front.—On the latter date an effective bombing raid was executed by units of the Royal Flying Corps and Australian Flying Corps against the enemy establishments in the vicinity of El Kutrani Station (on the Hedjaz Railway, 35 miles east of the southern end of the Dead Sea). Four hundred and seventy bombs were dropped on the station buildings and on railway trains, direct hits being observed on the objectives. One enemy aeroplane was destroyed in aerial fighting, and two of our machines failed to return."

General Headquarters, March 22nd.

"On the morning of the 21st inst. mist hung over the whole front. It cleared locally later in the day, but in most places the light was only suitable for low flying. The enemy's attacking troops and reinforcements on the battle front offered most excellent targets to the pilots of our low-flying machines, who poured many thousands of rounds into them, causing innumerable casualties. Our bombing machines also attacked these targets, in addition to bombing important railway stations on the battle front, a total of over 900 bombs being dropped by them. A great deal of fighting took place at a low altitude, in which 16 hostile machines were brought down and six were driven down out of control. A hostile balloon was destroyed by one of our pilots, and one of the enemy's low-flying aeroplanes was shot down in our lines by our infantry. Three of our machines are missing.

"During the night our night-flying squadrons in the southern area of the front were unable to leave the ground owing to the mist. In the northern area, where the weather was clear, our aeroplanes dropped three and a half tons of bombs on the dockyards at Bruges and three and a half tons on rest billets north-west of Tournai. All our machines returned."

General Headquarters, March 23rd.

"On the 22nd inst. thick morning mist prevented our aeroplanes from leaving the ground during the early part of the day. When the mist cleared activity in the air on the battle front became very great. The enemy's low-flying machines were particularly active, engaging our forward troops with their machine-guns. The enemy's massed troops again offered good targets to our own low-flying aeroplanes. The location of large bodies of hostile troops and transport were reported by our machines to our artillery and successfully engaged. Eight and a half tons of bombs were dropped on hostile railway stations in rear of the battle front and also on the enemy's billets, high-velocity guns, troops, and transport. Fighting in the air was very heavy indeed, almost all the combats taking place between Arras and St. Quentin. Twenty-seven enemy machines were brought down, and 20 were driven down out of control. Two hostile machines were also shot down in our lines by anti-aircraft gunfire, and another by our infantry. Eight of our machines are missing.

"During the night our squadrons dropped over 14 tons of bombs on hostile billets and ammunition dumps, and upon the areas in which the enemy's attacking troops were concentrated. All our machines returned."

General Headquarters, March 24th.

"On the 23rd inst. the weather again favoured operations in the air. Our aeroplanes were constantly employed in reconnoitring the position of troops, in

photography and bombing, and in reporting suitable targets to our artillery. Many thousands of rounds were fired by our pilots from a low height on hostile troops massed in villages and in the open. Bombing was carried on continuously throughout the day. Over 14 tons of bombs were dropped on the enemy's billets, on his high velocity guns, and on railway stations in the battle area. The enemy's low-flying aeroplanes were most persistent in their attacks on our infantry in forward areas. Many of these machines were attacked and brought down by our pilots. A total of 29 hostile machines were brought down, and 25 others were driven down out of control. Two of the enemy's balloons also were destroyed. Nine of our machines are missing.

"From nightfall until early morning our night-flying squadrons bombed the areas on the battle front in which hostile troops were concentrated as well as the enemy's ammunition dumps and large guns. Over 14 tons of bombs were again dropped by our machines, 2½ tons of which were dropped on the docks at Bruges. All our machines returned.

"During the same night 10 heavy bombs were dropped on the important railway bridge and works at Konz (just north of Trèves in Germany). Eight of these bombs were clearly seen to burst among the railway works. Nearly two tons of bombs were dropped from low heights on a hostile aerodrome south of Metz. Six bombs were seen to burst among the hangars and set fire to some huts on the aerodrome. All our machines returned.

"On the 24th inst. our machines carried out another most successful raid on the factories at Mannheim. Nearly 1½ tons of bombs were dropped, and bursts were seen on the soda factory and railway, and on the dock. Several fires were started, one of which was of great size, with flames reaching to a height of 200 ft. and smoke to 5,000 ft. The conflagration was visible from a distance of 35 miles. Our bombing aeroplanes were attacked by 32 hostile machines, and a fierce fight ensued. One of the enemy's aeroplanes was brought down in flames, and another was brought down and fell in the centre of Mannheim. Five others were driven down out of control. In spite of this severe combat and the enemy's heavy anti-aircraft gunfire, all our machines have returned except two."

French.

Paris, March 20th.

"Yesterday the bad weather and fog hampered aerial operations along the whole front. It is confirmed that the six German aeroplanes and captive balloons which were reported to have been damaged in fighting were really destroyed by our pilots on March 7th, 8th, 12th, 17th and 18th. Yesterday and the day before our bombing machines dropped during the day and the night 13,000 kilograms of bombs on aerodromes, cantonnements, and railway stations in the enemy zone. Several explosions and two fires were observed in the buildings which were bombarded. During the 16th Sub-Lieut. de Meuldré brought down his 10th enemy aeroplane."

Paris, March 21st.

"Sub-Lieut. Fonck brought down, during the day of the 17th, his 30th enemy machine."

"Salonica.—Allied airmen carried out several successful bombardments on enemy establishments in the valley of the Struma, in that of the Vardar, and to the north of the Moglena. One enemy aeroplane was brought down in air fighting."

Paris, March 22nd.

"It is confirmed that Sub-Lieutenant Herbelin brought down his 10th enemy machine during the day time on March 5th.

"During yesterday [Thursday] two German aeroplanes were destroyed and four others seriously damaged as the result of fights with our pilots. In addition, three more enemy machines were brought down by the fire of our special guns."

"Salonica.—Our artillery carried out destruction fire against enemy batteries in the Tchernia Bend. Allied aeroplanes made numerous successful bombardments of enemy establishments in the region of Seres and in the valley of the Vardar."

Italian.

Rome, March 17th.

"British airmen shot down an enemy machine to the east of the Montello. Last night our airships dropped two tons and a half of bombs on one of the enemy aviation grounds west of the Livenza."

Rome, March 19th.

"During the day in the course of aerial combats seven enemy machines were brought down; two of them by our own airmen in the Lagarina Valley, two by the French on the Asiago Plateau, and three by British airmen to the east of the Piave. During the night one of our airships bombarded with good results the enemy railway lines in the Lagarina Valley."

Rome, March 20th.

"Our airmen set fire to two enemy captive balloons at Conegliano and Colmirano (Alano Basin). Two hostile aeroplanes were brought down; one of them by French airmen at S. Giacomo di Veglia, the other by British airmen on the Asiago Plateau."

Rome, March 21st.

"On the evening of the 19th our anti-aircraft batteries shot down an enemy aeroplane at Campo di Pietra (north-east of Zenzen) and a seaplane on the seashore at Cortellazzo."

Rome, March 22nd.

"Our own and French airmen shot down an enemy machine above the Asiago Plateau; beyond the Piave British airmen brought down three more hostile aeroplanes, and forced a fourth to land. South of Motta di Livenza our artillery set fire to an enemy captive balloon."

Belgian.

Havre, March 20th.

"A German biplane was obliged to land yesterday in the neighbourhood of Parme. The officer and non-commissioned officer on board the machine were taken prisoners."

German.

Berlin, March 19th.

"We shot down in aerial battle yesterday and by fire from the earth 23 enemy aeroplanes and two captive balloons."

Turkish.

Constantinople, March 19th.

"In some parts of the western sector the artillery fire was more intense. Aerial activity was also lively. There is nothing else to report, owing to rain and fog."

And Some in Russia.

ANOTHER report states that in consequence of the disorganisation of transport an aerial postal service between Petrograd, Moscow, and the Crimea is to be introduced in the near future, while another service between Petrograd and Sweden is projected.

Austrian Aerial Mails.

It is stated that the Austrian War Ministry have consented to the employment of military aeroplanes for air service between Vienna and Kieff, a distance of 750 miles. Air services from the Austrian capital to Odessa and Constantinople are said to be under consideration.

AVIATION IN PARLIAMENT.

Loch Doon Aviation Scheme.

LORD BALFOUR, in the House of Lords on March 21st, called attention to the abandonment of the scheme for an aviation base at Loch Doon, and asked on whose authority the scheme was undertaken and on whose authority it was abandoned. His information was that some three millions of money had been spent on the scheme. He moved for a return of the expenditure involved.

Lord Rothermere, President of the Air Council, said he was not aware who was really responsible for the scheme. The Air Board was not in possession of the information. But if it was desired he would endeavour to obtain full particulars and communicate the information. The responsibility for its abandonment rested with the Air Council. The Air Council took over the construction of the work, and it was then found that Loch Doon was not suited for an aviation base. The project proved far more costly than was anticipated. The authorised expenditure was £120,000 and £420,000 was spent and sanctioned. It was very doubtful whether, after the expenditure of further considerable sums, the site would ever be suitable. An unfavourable report was received, and under these circumstances he invited two members of the Air Council to proceed to Loch Doon and report, and upon that report the Air Council decided that they had no alternative but to abandon the scheme, and the Army Council was so informed. The Air Council's decision was based on the fact that after 18 months' work Loch Doon was unfit for the scheme. The engineering difficulties were greater than anticipated. Sir John Hunter came to the conclusion that it could not be made available for aviation purposes. It would be, in his view, criminal to neglect anything that would conduce to increased efficiency. But the fact was that Loch Doon proved no good. The site was chosen in a hurry and, that being so, he ventured to think that it was impossible to justify any further expenditure on the scheme. They were still looking for another site.

After further discussion, Earl Curzon, Lord President of the Council, urged the House not to pass any motion on the subject at all. The noble Lord had said that a great mistake had been made, and that had been accepted by the House.

He agreed that their lordships were entitled to further information on the subject, and if Lord Balfour put down another question on the paper the information would be supplied.

The motion was by leave withdrawn.

Royal Air Force Medical Service.

MAJOR DAVID DAVIES, on March 18th, asked the Under-Secretary of State to the Air Ministry how far the arrangements for the medical care of the Air Service have been proceeded with; and what steps he intends to take to expedite the transference of Royal Army Medical Corps officers previously attached to the R.F.C. to the Air Forces, so as to be under the direct control and administration of the Medical Administrator of the Air Council in this country?

The Under-Secretary of State to the Air Ministry (Major Baird): The answer to the first part of the question is that the Medical Administrative Committee have met and have come to a number of decisions which are now being dealt with by the Air Council. The answer to the second part of the question is that the officers referred to will, in the first instance, be lent to the Air Force, and will be under the direct control of the Medical Administrator. When the conditions of service for medical officers who are to be seconded to the Air Force have been decided, those officers who are considered suitable will be seconded to the Air Force.

Prisoners in Germany.

MR. JOYNSON-HICKS asked the Under-Secretary of State for War whether a Lieutenant of the R.F.C. was recently sentenced in Germany to twelve months' hard labour for referring in a letter to the Germans as Huns; and, if so, what steps the Government proposes to take?

Mr. Hope (Lord of the Treasury): The officer referred to by my hon. friend is presumably Sergt. E. A. Boyd, R.N.A.S., who was reported by the German Press to have been sentenced to a year's imprisonment for referring in a despatch previous to his capture to the Germans as "Huns." According to the official German report Sergt. Boyd was sentenced for "insulting a superior and a subordinate." His Majesty's Government have asked for full details of the trial. I regret that so far no satisfactory reply has yet been received.

Mr. Joynton-Hicks: May I take it that the Government will continue to press for proper information?

Mr. Hope: Yes; I think my hon. friend may rest assured of that.

Air Raids into Germany.

MR. BILLING, on March 21st, asked the Prime Minister whether his attention had been called to a statement that Germany is prepared to refrain from air attacks on this country providing British raids over German territory cease; and whether, having regard to the avowed policy of the Government that British air raids into Germany were in no sense reprisals but legitimate acts of war, he will accept this indication from Germany as an expression of the success of our new aggressive air policy, and, in consequence, redouble British aerial activity over German towns?

Mr. Bonar Law: As regards the first part of the question, I have seen certain statements in the Press. As regards the second part of the question, the Government are doing everything in their power to make the raids into Germany effective.

Mr. Billing: Can this House understand that the raids which are being carried out into Germany are considered by His Majesty's Government as legitimate acts of war, and will not be discontinued in the event of the enemy squealing on the point of reprisals?

Mr. Bonar Law: The House does understand that they are, in our opinion, legitimate acts of war, and such acts are by no means undertaken as reprisals.

Royal Air Force Uniform.

MR. BILLING asked whether it is necessary for the Minister of State for Air to apply to the Treasury before making a special grant to all officers in His Majesty's Air Force to cover the initial cost of the new Air Force uniform now to be instituted; if so, if such application has already been made; and whether the Treasury have considered or are prepared to favourably consider it?

The Under-Secretary of State to the Air Ministry (Major Baird): The answer to the first and second parts of the question is in the affirmative, and the application is now under consideration by the Treasury.

Mr. Billing: When is it likely to be announced, having regard to the fact that many of these officers have been called on to buy their uniforms, and it is essential to their financial status that they should know whether they are to be called on to pay for it or not?

Major Baird: Nobody has to buy the uniform? It is distinctly stated that they can wear out the old uniform.

Mr. Billing: Is the hon. and gallant gentleman aware that the present Order has created a chameleon-like condition among these officers?

Mr. Speaker: The hon. member must not monopolise the whole of the time of the House.

Aerodrome in Midland Counties.

MR. PRINGLE asked the Under-Secretary of State to the Air Ministry whether an aerodrome is being constructed in the Midland counties; when the works were commenced; at what date it is expected to be completed; what has been expended up to date; what is the estimate of the total cost;

whether the land has been bought; if so, from whom and on what terms; and, if the freehold has not been bought, what arrangement has been made with the owners?

Major Baird: I am obliged to the hon. member for communicating to me privately the name of the aerodrome referred to. The work was begun in August, 1917. The adoption of the system of aircraft acceptance parks, subsequent to the initiation of the work, has rendered less necessary its immediate completion, and the work has been temporarily suspended, in view of the greater urgency of other works. The aerodrome will be completed by a private firm, and the State's contribution is limited to a fixed sum. Part of the land already belonged to the firm in question, and the rest was taken over under the Defence of the Realm Act.

The Supply of Parachutes.

MR. MORRELL asked the Under-Secretary of State to the Air Ministry whether the Government have considered the question of supplying parachutes to officers undergoing instruction in flying, as a means of avoiding some of the many fatal accidents that now occur; whether officers are now allowed in some cases to provide such parachutes at their own expense; whether these have in fact proved effective; and if he can say what is the reason against their being provided by the Government at all aerodromes where flying is taught?

Major Baird: No case is known of any officer under instruction providing or wishing to provide himself with a parachute. Experiments are proceeding, but no parachute suitable for use from an aeroplane has yet been arrived at. The last part of the question therefore does not arise.

Proclamation.

SIR J. D. REES asked the Under-Secretary of State to the Air Ministry why, in the titles of the Sovereign recited in the Proclamation regarding the name and style of the Royal Air Force, the title Emperor of India is omitted?

Major Baird: The use of the title of Emperor of India in official documents is governed by the terms of the Royal Proclamation of April 28th, 1876, of which I am sending the hon. member a copy.

Acceptance Parks.

MAJOR DAVIES asked the Under-Secretary of State to the Air Ministry whether he can state the number of aircraft acceptance parks which have been abandoned in this country; whether he will give the reasons for sanctioning the opening of these acceptance parks and the reasons for closing them down; and whether he can state the amount of money spent on these abandoned acceptance parks?

Major Baird: No ground primarily taken for an aircraft acceptance park has been abandoned. An endeavour was made to utilise as an acceptance park one station which had become superfluous to Home Defence requirements, but it was found impossible to make the aerodrome sufficiently good for the purpose. The whole amount expended from the first inception of the aerodrome as a Home Defence station was £15,000. The material used is, as far as possible, being employed elsewhere, and it is not yet possible to ascertain the net amount of unremunerative expenditure.

Air Raid Compensation.

CAPT. BARNETT asked the President of the Board of Trade whether he is aware that the Regulations of the Air Raid Compensation Committee give free compensation without insurance to owners of property of value not exceeding £500 but to other owners only if the excess value over £500 has been insured under the Government scheme; whether he is aware that the effect of these Regulations is to give full compensation to the person whose house value £500 is destroyed by hostile aircraft and no compensation whatever to the person whose house value £501 is destroyed unless he has paid a premium of one halfpenny in respect of the £1 excess; whether these principles have been applied in the case of Miss Tyler's property recently damaged in a London air raid; and whether he will take steps to amend, retrospectively if possible, these Regulations on the ground that their application has proved inequitable?

Sir A. Stanley: The Government only undertook to pay compensation, irrespective of any question of insurance, to the poorer members of the community. It was necessary to draw the line somewhere, and after careful consideration by a Committee appointed for the purpose, it was decided that uninsured persons should receive compensation if the value of their uninsured property did not exceed £500. The Committee thought that owners of property above that limit might fairly be expected to insure themselves against loss by taking out policies under the Government Insurance Scheme. No formal claim by Miss Tyler can be traced as having been received, and I would suggest that if there is any reasonable doubt as to whether or not the value of her insurable property is in excess of £500, she should supply particulars thereof to the Compensation Committee for consideration.

Triplex Glass.

SIR J. D. REES asked the Under-Secretary of State for War whether he is aware of the fact that Mr. Charles Higgins, F.R.C.S., has by experiments established the fact that Triplex glass, properly ground and treated, is a most valuable protection for the eye from projectiles, splinters, stones, and such substances as are scattered broadcast by shell bursts, and that such Triplex glass does not itself splinter and cause wounds when broken by a blow, by shot or otherwise; that it is also a protection in the case of the breaking of windows in cabs, cars, railway and other carriages, as a result of collisions; and whether he will enquire into this matter and see whether our troops can be supplied with such glass if the results of his enquiries are satisfactory?

Mr. Macpherson: The properties of Triplex glass are known to the War Office. Some two years ago the question was considered of substituting this glass for ordinary glass in spectacles for soldiers, but it was decided not to adopt it in view of the expense involved and of certain optical objections and difficulties in producing the enormous quantities of lenses required. Trials have also been made of vizors fitted with Triplex glasses for eye protection for the troops, but they have not been recommended for adoption.

Reprisals, &c.

GENERAL CROFT asked the Prime Minister whether, bearing in mind that two of our flying men have suffered about a month's imprisonment for dropping pamphlets it is proposed to inflict a reprisal on two enemy flying men in order to show the German Government our determination to secure proper treatment for British prisoners of war in their hands; and, in future, will he consider the advisability of at once taking reprisals for acts committed by the German Government against our prisoners of war instead of giving a time-limit during which period British prisoners are suffering such treatment?

Mr. James Hope (Lord of the Treasury): His Majesty's Government are fully determined to take all necessary measures to secure redress for British prisoners of war improperly treated by the enemy. We understand that the two British airmen in question have been released. As regards the second part of the question, I would remind my hon. and gallant friend that both Governments are bound under The Hague Agreement to give a month's notice before reprisals are started.

General Croft: Can the hon. gentleman tell me if it is a fact that German officers have been transferred from the West to the East Coast of this country?

Mr. Hope: It has been thought desirable to transfer a number of German officers from the West of England to the East Coast, but this must not be regarded as a measure of reprisals or punishment. The climate of the Kent and Essex coast is at least as good, and probably better, than that in a number of prison camps in Germany.

THE RECENT AND FUTURE GROWTH OF AERIAL LAW.

By Dr. H. D. HAZELTINE, Reader in English Law in the University of Cambridge.

II.—INTERNATIONAL LAW.

IN the second of his public Rhodes Lectures, at which the Rt. Hon. Sir Walter Phillimore presided, delivered at University College on Monday, March 11th, Dr. Hazeltine confined his attention to the recent and future growth of the law of aerial warfare.

Dr. Hazeltine first sketched the history of aircraft in war. As early as 1783 Girond de Vilette drew attention to the value of the balloon for purposes of reconnaissance. In the first Coalition War the *Entreprenant* and other balloons rendered invaluable services to the French. Strange to say, Napoleon made no use of the balloon in warfare. But in many wars since his time valuable reconnaissance and other services have been rendered by aeronauts. In the wars of our own times aircraft of all kinds have been used not only for reconnaissance, but also for many other purposes. During the present war there has been a marvellous development of aircraft and wireless telegraphy, and these two means of using air-space for belligerent and neutral purposes have been brought into full co-operation one with the other. Aircraft, assisted by wireless, are now employed constantly for reconnaissance, attack, defence, convoy, directing artillery fire, sending despatches, provisioning besieged places, dropping of propaganda literature in enemy territory, defence of neutral territory and air-space, and for various other purposes of belligerent and neutral states. Aircraft are not only the "eyes" of the Army and Navy and the "cavalry of the air," they are also rapidly becoming the infantry and artillery of the air in warfare over land and the battleships and destroyers of the air in warfare over the sea. The astounding developments of the present war are rapidly leading to the formation of the Air Force as the third armed force of states separate and distinct from the older forces, the Army and Navy. In this country the Air Force (constitution) Act, 1917, forms the constitutional and legal basis for the establishment of the Air Force and the Air Council. The Air Council has already been constituted, and the formation and establishment of the Air Force will soon be completed. In other countries also the tendency is now towards the institution of the Air Force as a third armed force; and there can be no doubt that the British precedent will be generally followed. New problems in warfare and in international law during time of war are raised by the establishment of the Air Force of States. In warfare there are problems as to independent operations by the Air Force, and as to its co-operation with the Army and Navy. In this country these problems, which are of vital importance, are being carefully studied and efficiently solved by the authorities. Within the realm of international law the new problems are not less difficult. So long as the aerial resources of states were integral parts of the Army and Navy international lawyers, in the absence of special rules in regard to aircraft, have applied the rules of land and sea warfare to aircraft so far as those rules are appropriate to warfare in the air. An illustration of this principle is seen in the application of the international rules in regard to bombardment in land and sea warfare to the bombardment of towns by aircraft. Once the Air Force exists as a separate, distinct agency of the state for the overpowering of the enemy, are the rules of land and sea warfare to be applied as they have been in the past? In the absence of international conventions in regard to aerial warfare as such, the only safe principle to follow during the present war would seem to be that, whether the Air Force is operating independently or in co-operation with the Army and Navy, the established rules of international law and morality for the conduct of land and sea warfare ought to be applied in so far as they are applicable to aerial warfare. The present problem of the international lawyer is to apply, as well as he can, the existing rules, remembering that these rules have grown up, by custom or by convention, for the conduct of land and sea warfare, not for that of air warfare. There are, however, one or two rules of international law which have been established with special reference to aircraft; and to these rules we shall come presently. After the war the whole vast problem as to aerial warfare will be subjected to careful and anxious study by the statesman and jurists of the whole civilised world. A new international aerial code, carefully defining and limiting the rights and duties of belligerent and neutral states in time of war, must be formulated. This new code of aerial warfare will ultimately take its place beside revised and improved codes

of land and sea warfare. But more important than the formulation of codes of warfare will be the growth of the moral sense of all belligerents, a morality which will lead them to observe, with scrupulous care, the principles of the law. In this matter the conduct of British and allied armed forces in the present war has set a high standard for the forces of the enemy states.

Before the war the fundamental problem as to the legitimacy of aerial warfare was much debated by international jurists, but at the present time this whole question must be viewed as solved. The Hague Declaration of 1907 prohibiting the discharge of projectiles and explosives from aircraft has not been binding during the present war. Several of the leading belligerent states were not parties to this Declaration, which expressly provides that it shall cease to be binding when, in a war between the contracting parties, one of the belligerents has been joined by a non-contracting power. When one considers the fact that conventional international law embodies no binding prohibition of the use of aircraft in warfare and that the Declaration of 1907 has for the present war no force and effect, one must conclude that the belligerents are entitled to employ aircraft. In addition to these considerations one must also remember that aircraft have long been used in time of war, and that throughout the present war nearly all the leading states of the world and many of the smaller states as well have, as belligerents or neutrals, employed aircraft for their purposes. In the absence of a conventional prohibition of binding force and in the presence of this established practice one is forced to the conclusion that aircraft have become legitimate instruments of warfare in accordance with customary international law.

The fundamental question, then, is not whether aerial warfare is legitimate, but what are the limitations imposed upon belligerent states in the use of aircraft by the existing rules of international law and morality. At its meeting in Madrid in 1911 the Institute of International Law passed the following resolution: "Aerial warfare is permitted, but only on the condition that it does not present for the persons or property of the peaceful population greater dangers than land or sea warfare." This considered opinion of many of the leading international jurists of the world is not in itself a part of international law, but it embodies nevertheless an enlightened principle of morality for the guidance of belligerents. The general practice of the airmen of the Entente allies corresponds with this principle, while the general practice of the enemy airmen deviates from it in very important directions. An illustration of enemy practice is to be found in the disregard of the peaceful population manifested by German airmen in the course of their bombardments of undefended and defended towns in England and in other Entente countries.

Apart from this general doctrine of international law and morality in regard to the peaceful population, there are certain fundamental principles of the law of nations which are applicable to aerial warfare.

In the first place, the region of aerial warfare is restricted in a geographical sense. The region of land and naval warfare includes the territories and territorial waters of all the belligerent states and the high seas. This surface region of land and sea warfare is also the surface region of aerial warfare; but, in addition to this surface region, there is in aerial warfare the air-space region, which includes all the air spaces above all the territories and territorial waters of all the belligerents and also all the air-spaces above the high seas. Within all this expanse of land, water, and air space aerial warfare, conducted in accordance with international legal principles, is legitimate. Belligerent airmen may engage in aerial combats at any height within the region of war; they may descend to low altitudes and attack troops on land or submarines on the high seas; they may even descend upon the surface of belligerent territory, territorial waters, and the high seas and still be within the region of aerial warfare.

Excluded from the region of land and sea warfare are the territories and territorial waters of all neutral states. Neutral territories and territorial waters are likewise excluded from the region of aerial warfare, and so too are the air spaces above them. The principle that neutral air space is beyond the region of aerial warfare is one of great importance. Before the present war certain advocates of the freedom of

all the world's air spaces contended that, upon this doctrine, even air spaces above neutral states were comprised within the region of warfare between belligerent airmen. But throughout the war belligerent and neutral states alike have in general recognised the principle that the sovereignty of a neutral state extends to its entire air space and that within this entire air-space belligerent aerial activity is not permissible. Entry within this neutral air-space by belligerent aircraft for any purpose is, as a general principle, viewed as a breach of neutrality. This amounts to saying that all neutral air space is outside the region of aerial warfare. The establishment of this principle by the general agreement of belligerent and neutral states constitutes an important feature of recent growth, to which reference will be made in dealing with neutrality.

The region of aerial warfare is, then, that part of the surface and air-space of the earth in which belligerents may prepare and execute aerial hostilities against each other. The theatre as distinct from the region of aerial warfare is that part of the earth's surface and air-space in which hostilities actually take place. In a legal sense only the region of aerial warfare may be made the theatre of aerial hostilities, but not every part of the region of warfare is necessarily the theatre of hostilities. Inasmuch as New Zealand is a part of the British Empire, its territory, territorial waters and the air space above them are within the region, although they are not within the theatre of aerial warfare.

A second principle of the law of nations applicable to wireless stations and apparatus and to aircraft alike is that property invested with public and property invested with private character are subject in many ways to different legal treatment. This fundamental distinction is already a part of conventional international law in regard to telegraphy and of customary international law in regard to aircraft. During the present war the distinction between public and private aircraft, on the analogy of the difference between public and private seacraft, has not been of practical significance owing to the fact that within the theatre of warfare only public aircraft have been in service. It is possible that before the close of the war private aircraft may be employed by subjects of belligerent and neutral states, within the theatre of war, for the carriage of mails, passengers, and goods. In this event important questions will arise as to blockade, contraband, and the capture of private property, and belligerent states will be obliged to decide whether or not they will apply the existing principles of maritime international law for time of war.

In theory, public aircraft are of two kinds: military and non-military. Prior to the war the problem as to the definition of military aircraft was carefully considered by international jurists. Dr. Spaight, in his proposed code for aircraft in war, suggested the following definition: "An aircraft shall be considered to be a military aircraft and its crew to be belligerents provided the aircraft is under the direct authority, immediate control, and responsibility of a belligerent Power, that it bears the distinctive sign of its character as a military aircraft of the said Power, irremovable and recognisable at a distance, and that its crew are subject to military discipline, observe the laws and customs of war, and wear the uniform or other distinguishing emblem of their national forces." The practice of belligerent states during the present war corresponds in general with this pre-war definition of military aircraft. It is to be remarked also that the definition is sufficiently broad to cover not only aircraft employed by the aerial services of armies and navies, but also the aircraft of the Air Force as distinct from the Army and Naval forces of states, for example, the new British Air Force soon to be established under the Air Force (Constitution) Act, 1917. The definition is in one respect too narrow, for it includes only the military aircraft of belligerent states. The war has shown that neutral states employ the aircraft of their aerial services to protect the neutrality of their air-spaces above state territory and territorial waters, against the entry of belligerent airmen. The definition of military aircraft should include, therefore, the aircraft of belligerent and neutral states, although neutral aircraft and airmen are naturally subject to legal principles different from those applicable to the aerial craft and forces of belligerent states.

A third principle of the law of nations applies to airmen as well as to other members of the combatant forces of the state at war. International law has carefully prescribed the nature of legitimate and illegitimate weapons and other means of waging war. As combatants airmen are limited by those international rules no less than soldiers and sailors. So long as airmen are embodied in the aerial services of an army or navy this principle is perfectly obvious; for such airmen are members of the army or navy and subject to the established

rules of warfare on land or on sea. Are the members of an air force, as distinct from the older forces of army and navy, to be freed from the limitations imposed by established international law in regard to the means of waging war permissible to soldiers and sailors? Is it open to the airmen of an air force to use any weapons they see fit? No international lawyer would hesitate to answer this question in the negative. For the duration of the present war, and until such time as special rules are formulated by international conventions for the conduct of air warfare, the only sound principle to follow is that airmen of an air force are subject to the existing rules so far as they are in the nature of the case applicable to airmen. Thus, the rules of international law which forbid the use of expanding bullets and asphyxiating gas are rules which on legal and moral principles apply to all airmen, whether of the army, navy, or air force, as to all other combatants. But if one belligerent state uses illegitimate weapons or other means of warfare, the enemy state may also employ them by way of reprisal; the use of gas by the Germans in the present war led to its employment in reprisal by the Entente allies. In the same way if the enemy airmen use illegitimate weapons or means of warfare, the airmen of the opposing belligerent are entitled, by way of reprisal, to use the same. Bombs and machine-guns have been the chief weapon of aerial warfare during the present world-struggle; and it may be said that belligerent airmen have observed, as a general rule, the law of nations in respect to legitimate and illegitimate weapons. In no instance have Entente airmen infringed the law.

There is a fourth principle of international law which, in its relation to airmen, deserves special notice. Members of belligerent forces who are captured by the enemy are held as prisoners of war until the end of the war, when they are set free; and, even before the end of the war, they are sometimes set free, as upon an exchange of prisoners. Bismarck's opinion that balloonists captured over the enemy's lines should be treated as spies and thus punished by death has never been adopted as a principle of international law. Indeed, the whole tendency of international legal development has been in the direction of treating airmen, if they have conducted themselves openly and without disguise, as ordinary prisoners of war. Almost without exception this has been the constant practice of all belligerent states during the present war.

One exceptional case of recent occurrence deserves, however, careful consideration. Two British airmen, who were shot down near Cambrai on October 17th of last year, have been sentenced by a German field court-martial to ten years' imprisonment with hard labour for dropping leaflets behind the German lines. Through diplomatic channels the British Government has informed the German Government that unless the British airmen are released and their sentences cancelled within one month—the period fixed by the recent Hague agreement between Great Britain and Germany for giving notice of intended reprisals in such cases—the British authorities will take punitive measures adequate to meet the circumstances. It is understood that no reply has been received as yet from the German authorities. In the absence of a satisfactory answer reprisals by the British authorities will come into operation to-morrow, March 12th, the end of the period of one month from the date of the notice by the British Government.

Three comments may be made upon this incident. In the first place, airmen of both sets of belligerent states have for some time dropped printed matter, upon many occasions, behind the enemy lines. If anything, German and Austrian airmen have done this more often than those of the Entente allies. In the second place, the British Government have taken a correct attitude in maintaining that such acts do not constitute offence against international law. The act of dropping leaflets is clearly not one of espionage. In the absence of any explanations from the German authorities it is impossible to see any legal justification for the penal imprisonment of the airmen for a long term of years; they ought to have been treated as ordinary prisoners of war. In the third place, the student of the history of warfare will see in the conduct of the German authorities a return to mediæval practices. In antiquity, prisoners of war could be, and were, killed or enslaved, and these practices were continued during the earlier Middle Ages. The influence of Christianity gradually effected a change. During the later Middle Ages prisoners of war were not as a rule killed, while, with the disappearance of slavery in European countries, they were no longer subject to bondage of this character; but they were often treated in a most cruel manner. In the period of the gradual formation of the modern system of international law the killing and enslavement of prisoners disappeared

completely from warfare; but, as a survival of earlier barbaric customs, their treatment was often that of criminals and objects of personal revenge. The whole tendency of international customary and conventional law in modern times, down to our own day, has been the humane treatment of prisoners of war on the principle of an advanced civilisation. The treatment of the British airman as criminals who are to undergo imprisonment for ten years with hard labour is, therefore, another striking illustration of the fact that in warfare Germany has reverted to the barbaric practices of bygone ages. To compel the enemy to observe present-day international rules of warfare by treating the two British airmen as ordinary prisoners of war reprisals are the only legitimate method left to the British authorities, if diplomatic protests through neutral channels prove to be unavailing. [On the morning of March 12th, the day after the delivery of Dr. Hazeltine's lecture, it was announced in the Press that the British reprisals policy had proved effective; that the German authorities had agreed to annul the sentences on the British airmen and to send them back to their camps as ordinary prisoners of war.]

International law embodies a fifth general principle, applicable to belligerent airmen no less than to all other combatant forces of states at war. This principle is that the objects of attack within the region of war are limited both in respect to persons and to property. There are legitimate and illegitimate objects of hostile aerial action.

The legitimate objects of aerial attack are, in the first place, the members of the armed force of the enemy state—the enemy's soldiers, sailors and airmen. These enemy persons belligerent airmen may seek out for the purpose of killing or capturing. In the second place, certain enemy properties may be destroyed by hostile aircraft. The things which are thus the legitimate objects of attack include both real and personal property of military value to the army, navy or air force of the enemy. Included in this category are the enemy's fortifications, barracks, hutments, naval stations, aerodromes, hangars, guns, stores, ammunitions, barbed wire entanglements, tanks, war-vessels, transports, wireless stations and apparatus, and military aircraft.

On the other hand, there are certain categories of enemy persons and properties exempt from hostile attack by the armed forces—army, navy, and air force—of states at war. This general doctrine of international law that it is illegitimate to attack certain kinds of enemy persons and enemy property is one of the fundamental charters of humanity and civilisation; but it is a charter which the Central European states have ruthlessly broken, throughout the present war, in the conduct of hostilities on land, at sea, and in the air. The vital importance of this charter of protection, as a safeguard against the transformation of civilised warfare into barbaric practice unlimited by the restraints of law and morality, calls for the most earnest study of the charter's basic rules for the conduct of land, maritime, and aerial warfare.

One of the leading characteristics of this international charter of protection, based on the established customs and agreements of states, is that bombardment is limited in respect to its purpose and scope. With one or two exceptions there are no rules of conventional international law specially formulated for the conduct of aerial bombardment. The task of belligerent air forces and of jurists is to apply to aerial bombardment the principles of international law in regard to bombardment in land and maritime warfare. Inasmuch as air forces have formed integral parts of armies and navies this procedure has been not only natural but necessary; for otherwise, in the absence of a code of rules specially designed for aerial bombardment, belligerent airmen would be unfettered, save in one or two particulars, by any legal restraints. But the history of aerial bombardments, during the present war has shown that the existing rules of land and sea bombardment not only need revision in respect

to their own special spheres of operation, but that some of the rules appropriate enough to bombardment by artillery or seacraft are not adequate to meet the facts connected with bombardments from the air. Aerial warfare in many of its aspects, including that of bombardment, has rapidly assumed a special character of its own, differing in important particulars from land and maritime warfare, although closely allied to them. Before very long the air force of other countries as well as of Great Britain will be constituted as a third armed state force, distinct and different from the army and navy, although acting, in the design and execution of warlike operations, in co-operation with the older institutions. The rise of the air force represents a recognition on the part of the State authorities that warfare in and from the air space possesses individual features of its own. The facts of the war point the way to the future growth of a body of international rules of aerial warfare as distinct from land and sea warfare, and in the formulation of these rules the facts of the war will themselves be subjected to close study as embodying new practices of belligerents. These general observations apply with special force to that phase of aerial warfare known as aerial bombardments or air raids. In devising the future rules of bombardment by aircraft all of the many thousands of air raids carried out during the present war must be carefully studied from all points of view, including their purpose and their scope as they affect the persons and property of the populations of the states at war.

The rules governing bombardment in land warfare draw a sharp line of distinction between defended and undefended localities.

The rule in regard to undefended localities is simple and clear. Article 25 of the Hague Convention (IV) of 1907 concerning the laws and customs of war on land provides that "the attack or bombardment, by any means whatever, of towns, villages, habitations, or buildings which are not defended is forbidden." The words "by any means whatever," introduced in 1907 on the proposal of the French delegate to the Hague Conference, were intended by the framers of the Convention to cover the case of bombardment by aircraft. Article 25 contains, therefore, an express and absolute prohibition of aircraft bombardment of all undefended localities, and this prohibition is in force during the present war, for Article 25 has never been abrogated or amended.

The rule of international law in regard to the bombardment of defended localities in land warfare is equally simple and clear: such localities are liable to bombardment. Although international conventions have never expressly applied this principle to bombardment by aircraft, this extension of the scope of the principle rests on the general agreement of jurists and the practice of belligerent states. In the present-day system of international law the aerial bombardment of defended localities is to be viewed as a legitimate method of warfare.

But this principle that artillerymen and airmen may bombard defended localities is subject to important limitations, one of which is that there are certain classes of persons and properties within defended localities which are protected from the attack of the forces of the enemy carrying out a bombardment. These immunities of persons and of things are based not alone on the established customs of international law and morality, but also on the texts of international agreements, such as the Geneva Convention and the Hague Convention, concerning the laws and customs of war on land. In the midst of the Great War, when the customary and the written laws of nations are equally disregarded by the enemy states, these legal immunities deserve to be repeatedly and emphatically impressed upon the mind of the civilised world in order that the law-breakers may be restrained and punished by legal and moral processes.

(To be concluded.)

Air Raids on Paris.

AT 10.20 p.m. on March 22nd, a group of enemy aeroplanes crossed the French lines. A certain number of bombs were dropped on Compiègne and various towns in the district. Some of the aeroplanes pushed further south, but had to beat a retreat owing to the strong anti-aircraft fire. The alarm was also given in Paris, but half an hour later the "All clear" was sounded.

At 8.20 a.m. on March 23rd, a few German aeroplanes, flying at a very great height, have succeeded in crossing the line and attacking Paris. They were immediately engaged by aeroplanes both of the Paris defences and of those of the front. Several bombs are reported to have fallen. There are some casualties.

At 8.42 p.m. the same day enemy aeroplanes crossed the French lines and bombarded several places at the rear of the front, but did not reach the Paris region.

Long Flights in Algeria.

THREE French aeroplanes which left the oasis of Ouargla, Algeria, on March 14th, arrived the same day in In-Salah, having covered a distance of 750 kilometres (465 miles) in 7 hours 22 minutes.

An Aeroplane from Swaziland.

THE Chief Regent, chiefs, and people of Swaziland have presented £1,000 to the King for the purposes of the war. The King has approved of the sum being used for the purchase of an aeroplane for the Royal Air Force.

LEGAL INTELLIGENCE.

Compensation for Injury in Air Raids.

In the House of Lords on March 21st, the Lord Chancellor, Lord Atkinson, Lord Parker of Waddington, and Lord Wrenbury dismissed an appeal from a decision of the Court of Appeal setting aside an award of the Judge of the Bow County Court under the Workmen's Compensation Act, 1906. The appellant at the time of the accident was employed as a potman at the respondent's publichouse, and he was told by the respondent to clean a brass plate on the street door of the publichouse. He was standing outside the door of the publichouse and was in the act of cleaning the brass plate when a bomb dropped by hostile aircraft fell in the street and he was injured by the concussion of the explosion, and was for some weeks totally incapacitated for work. He claimed compensation for the accident.

It was held by the County Court Judge that the accident arose out of and in the course of the employment and he awarded compensation to the appellant. The Court of Appeal held that there was no evidence upon which the County Court Judge could hold that the accident arose out of the employment and directed that an award should be entered in favour of the respondent.

The Lord Chancellor, in giving judgment, said there was no evidence that the risk of being struck by a bomb during an air raid was a risk of the streets in the sense that there was a special danger from such a risk to a person being in a street as distinguished from a person being in a house. In these circumstances it was quite impossible to say that there was a special danger attaching to the spot to which this man was sent as distinguished from the publichouse itself. It was also impossible to say here that the danger of being struck by a bomb could be properly called a street risk in the sense that it specially attached to persons passing along the streets. The decision of the House in this case determined no principle of general application. It depended simply on the fact that there was neither evidence nor finding that this was a street risk to which the appellant was exposed by the nature of his employment.

The other able and learned Lords concurred.

The Cowper-Coles Aircraft Co., Ltd.

In the Chancery Division of the High Court of Justice on March 15th, Mr. Justice Sargant gave his decision in the motions of the Cowper-Coles Aircraft Co., Ltd., v. Cowper-Coles and the Cowper-Coles Aircraft Co. and Cowper-Coles v. Taylor and King.

After reviewing the evidence, Mr. Justice Sargant said he was bound to continue until the trial the injunction which was granted by Mr. Justice Neville, subject only to this: that it was pointed out that although Mr. Cowper-Coles had ceased to be the director of the company, he was, nevertheless, entitled under article 15 of the articles of association of the company to attend the meeting of the directors during his life, although he should have ceased to be a director, therefore he proposed in continuing that injunction, to declare that

nothing in it was to be taken to interfere with Mr. Cowper-Coles' right of attending the meetings of the directors.

Then as regards the motion in the other action, it seemed perfectly clear now that Mr. Cowper-Coles had no right in the second action to use the name of the company; on that motion he must give effect to what was asked and strike out the name of the company.

Then, with regard to the motion that was launched by Mr. Cowper-Coles, there was first an injunction asked to restrain the defendants, Taylor and King, from disposing of any of the ordinary shares in the plaintiff company, now standing in their names in the books of the plaintiff company. As regard that, they both undertake in the terms of that notice of motion, until the trial, and that undertaking accordingly would be embodied in the order. Then it next asked for an injunction to restrain them from acting or purporting to act as directors of the plaintiff company, or from in any way interfering in the management of the plaintiff company, or its affairs or assets. Of course, that injunction was not granted. Then he asked for an injunction to restrain the defendant Taylor from drawing cheques on the company's account in his sole name. That injunction was not granted. Then he asked for an injunction to prevent Taylor from applying or using any of its funds or assets otherwise than on behalf of the plaintiff company. There again, Mr. Taylor while not making any admission that he has dealt at all improperly with the funds or assets of the company, agreed to give an undertaking until the trial, and that undertaking would be embodied in the order. Except for those undertakings, no other order would be made on that motion.

Air Board Contracts.

BEFORE Judge Atherley Jones at the Central Criminal Court on March 21st, the trial was continued of Hugh John Williams, 27, clerk, on the indictment charging him with attempting to obtain from Mr. Frederick James Newman, of Messrs. Lloyd and Sons, Deptford, £303 2s. 6d., as an inducement for doing and forbearing to do certain acts in relation to the affairs of the Air Board. Defendant pleaded "Not guilty."

In cross-examination by Mr. Travers Humphreys the defendant said he thought there was bribery going on, but he did not mention a word to the authorities because he had no facts. He considered it up to him to obtain the necessary facts. That was what he endeavoured to do, and failed.

Mr. Travers Humphreys: Do you ask the jury to say now that either Mr. Lloyd or the witness Newman are dishonest people?—No, sir, most emphatically, no. They have proved themselves not to be acting as they did in at once reporting to the Air Board.

The trial was concluded on the following day; the jury found the defendant Guilty, but recommended him to mercy on the ground of his age and the excellence of his past career. Judge Atherley Jones sentenced him to six months' imprisonment in the second division.

Judge Atherley Jones, in summing up, after referring to the facts of the case, said there was not the slightest ground for casting the smallest imputation on Mr. Lloyd's commercial morality.

◆ ◆ ◆ SIDE-WINDS.

IN a wittily written brief history of the Aircraft Supplies Co., Ltd., Mr. Geo. H. Mansfield, the Managing Director, has told us that he founded the firm as the result of an accident. Anyway there must be many who have cause to be thankful for the accident. Since its foundation three years ago the company, under the energetic and enthusiastic direction of Mr. Mansfield, has grown until it is now necessary to have representatives in the chief provincial centres. Last week these representatives were in London for a conference, and Mr. Mansfield entertained them at lunch at the Holborn Restaurant together with a few friends who have in one way or another helped him to make the "Ascol" name as widely known as it is to-day. A busy man himself, Mr. Mansfield saw to it that speeches were few and brief. Mr. Henry C. Knox, whose practical help proved most valuable to Mr. Mansfield in the early days, proposed—we think it must have been the first time in history—the "Royal Air Force," and Lieut. H. E. Horne, R.N.V.R., responded. Mr. Stuart A. Hirst proposed "the Company," and contributed a few home truths on the "Ethics of Salesmanship." Mr. Mansfield, in replying, outlined the "Ascol" aims and policy. He went on to propose the "Aircraft Industry," which was responded to by Mr. Robert Blackburn, who pointed out how the producer of parts and fittings could assist the designer. Finally, Mr. J. S. Birks, who represents Ascol along the South Coast, proposed the health of the Chairman, and showed that Ascol representatives are confident that they are on a good

thing. As was to be expected from such a genius for organisation as Mr. Mansfield, the arrangements were perfect and the charming menu and souvenir, the work of the Meerloo Publicity Company of 166, Piccadilly, was much admired, while the history of the firm by Mr. Mansfield was quite amusing, and was well illustrated by views of the Ascol works.

It was, of course, a business man's gathering entirely, or if the fair sex had been included one would have looked for the presence of Miss Nicholson, the lady representative who put in such good work for the Aircraft Supplies Co., Ltd., in its earlier days. Although in these days women are valiantly taking up all kinds of war work, it is sufficiently unusual to be worthy of comment that one should be found capable of dealing with the technical details of aeroplane construction as she rapidly proved herself.

OWING to a notice which has recently appeared with regard to the voluntary winding up of Nieuport (England), Ltd., a false impression has arisen in some quarters that it is the "Nieuport" and General Aircraft Co., Ltd., which is being wound up. We are informed that the facts are that the business of Nieuport (England), Ltd., was taken over by the "Nieuport" and General Aircraft Co., Ltd., some twelve months ago, and instantly the Nieuport (England), Ltd., had no *raison d'être* to remain in existence, and was consequently liquidated.

COMPANY MATTERS.

Rolls-Royce, Ltd.

PRESIDING at the annual general meeting at Derby on March 22nd, Mr. Ernest Claremont asked the shareholders to excuse the absence of some members of the Board, whose duties of national importance required them elsewhere. Although the accounts were not ready, they were fortunate in being able to foresee that the profits would not be less than those of last year, and so the same dividend could be safely declared. So far the profits have been small and the company have had no excess profits to pay.

Mr. Claremont then explained the scheme of bonus shares, which he said was really capitalising the reserves. These reserves consist of reserve fund £136,000, premium on shares issued £53,248, war contingency fund £50,000, plus the amount carried forward last year £43,000 odd, making a total of £229,000. It is proposed to double the capital to £400,000 by issuing 200,000 £1 shares, to be distributed "share for share" among the present shareholders.

Mr. Claremont said the company's energies continued to be fully engaged on the production of munitions of war, and he had no doubt would continue to be so while the war lasts. He took much pleasure once more in expressing, on behalf of the Board, their appreciation of the whole-hearted efforts of the company's staff, from Mr. Royce, the engineer-in-chief, and Mr. Claude Johnson, the general managing director, downwards. He had been told by a shareholder that there was a rumour that the company was amalgamating with another company, and, to prevent any misunderstanding, he would state that nothing of the kind was in contemplation. He had also been asked to give some information of the American works. They had no works in America, and were only obtaining materials and goods from that country to increase output. He wished he could tell more about the business, its expansion, and the wonderful achievements with its engines, but his tongue was tied.

A cash dividend of 10 per cent. for the year (less income-tax) was declared, and the proposed distribution of bonus shares was agreed to.

The retiring directors and auditors were re-elected.

D. Napier and Son, Ltd.

At the adjourned general meeting on March 20th, Mr. H. T. Vane, C.B.E. (joint managing director), presided in the absence, through indisposition, of the chairman, Mr. Montague S. Napier.

Mr. Vane, in moving the adoption of the report, said that the financial position of their company as set out in the balance-sheet would, he thought, be regarded as very satisfactory, especially taking into consideration the abnormal conditions under which they had been working during the year. The increased cost of labour and material, and the delays experienced in obtaining delivery of the latter, had been serious difficulties to contend with, but the employees and staff had put forth their best efforts to increase the output. The result had been that they had far exceeded any previous year's output, and it was their intention during the present year to endeavour to do even better in that direction when they had their new building complete, and the new plant in operation. He was a strong believer in the future of aero engine manufacture. The requirements will be large, both for Government and civilian purposes, for he anticipated that aerial posts will be established between many points, apart from light freight and passenger planes.

The future of the motor industry should be a bright one, especially in view of the way in which motor transport has proved its superiority over all other kinds of transport. There was great need, however, for proper adequate Government protection for the trade, especially during the few years following the conclusion of peace. They had to rebuild their sales organisations and to put their factories on a peace footing, which was very distinct from a war footing, and they looked to the Government to aid the industry in that direction, especially having regard to the patriotic way in which the whole industry had adapted itself to Government requirements and loyally supported them during the course of the war. Since the last meeting Mr. L. B. Peters, M.I.M.E. (chairman of G. D. Peters and Co., Ltd., director of Gwynnes, Ltd.), has been elected to the board of directors.

Mr. W. H. White (director) seconded the report, which was carried unanimously.

The chairman then proposed that a final distribution by way of bonus be made to the Ordinary shareholders of 1s. 6d. per share, free of income-tax.

NEW COMPANIES REGISTERED.

LLOYD DIX AND CO., LTD., 132, King Edward Street, Great Grimsby.—Capital £1,000, in £1 shares. Acquiring the

business of moulding manufacturers and picture frame makers, carried on by G. T. Lloyd and R. W. Dix at Great Grimsby; also manufacturers of wooden parts and fittings of aeroplanes, &c. First directors: Y. H. Bennett, R. Jennison, G. T. Lloyd and R. W. Dix.

BUSINESS NAMES REGISTRATIONS.

ANTOINE AND CO.—Registered January 17th, 1918. Manufacturers and repairers of aero engines and general engineers, 4a, Chapel Street, Marylebone, N.W. 1. Proprietor, T. Antoine (Belgian), 250, Lauderdale Mansions, Maida Vale, N.W.

SOUTH AFRICAN AVIATION CO.—Registered January 9th, 1918. Aircraft manufacturers, 54 Queen Street, Camden Town, N.W. 1. Business commenced December 22nd, 1917. Partners (1) C. P. G. Jacob (British), 53, Park Lane, Wallington, Surrey; (2) A. Goslett (British), 85a, Golders Green Road, Golders Green, N.W.

CORRESPONDENCE.

"Royal Airey."

[1954] I have just read that in future the two Flying Services will be joined under the name "Royal Air Force."

This name is certainly a very good and forceful one, but why not "Royal Airy," which would be synonymous to Royal Army and Royal Navy?

FREDERICK R. SIMS.

Simms Motor Units, Ltd., Gresse Street, Rathbone Place. March 31st.

PUBLICATIONS RECEIVED.

Aviation Engines: Design—Construction—Operation and Repair. By 1st Lieut. Victor W. Page, A.S.S.C., U.S.R., &c. London: Crosby Lockwood and Son. Price 15s. net.

Aeronautics in Theory and Experiment. By W. L. Cowley, A.R.C.Sc., D.I.C., and H. Levy, M.A., B.Sc., F.R.S.E. London: Edward Arnold, 41-43, Maddox Street, W. Price 16s. net.

Woodwork Joints. (The Woodworker Series.) London: Evans Brothers, Ltd., Montague House, Russell Square, W.C. Price 3s. 6d. net.

Catalogues.

Aerial Type Fan Brake Dynamometers. W. G. Walker and Co., Emery Hill Street, Victoria Street, Westminster, S.W.1.

Horse-Power Dynamometer. W. G. Walker and Co., Emery Hill Street, Victoria Street, Westminster, S.W.1.

Aeronautical Patents Published.

Applied for in 1917.

The numbers in brackets are those under which the Specifications will be printed and abridged, &c.

Published March 28th, 1918.

- 228. R. BLAKOE. Aeroplanes. (113,629.)
- 2,987. GREENE AERONAUTICAL CO. Aeroplane. (113,659.)
- 3,335. A. L. AND R. ANDERSON. Locking-device for bracing wires of aircraft, &c. (113,673.)
- 7,678. SOPWITH AVIATION CO. AND H. G. HAWKER. Attachment of aerofoils of aeroplanes. (113,723.)
- 9,418. GOODYEAR'S INDIA RUBBER GLOVE MANUFACTURING CO. Manufacture of aeroplane elements. (113,736.)
- 18,420. E. PENSUTI. Speed indicators for aerial machines. (112,023.)

If you require anything pertaining to aviation, study "FLIGHT'S" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages xlviii, xlix, and l).

FLIGHT

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